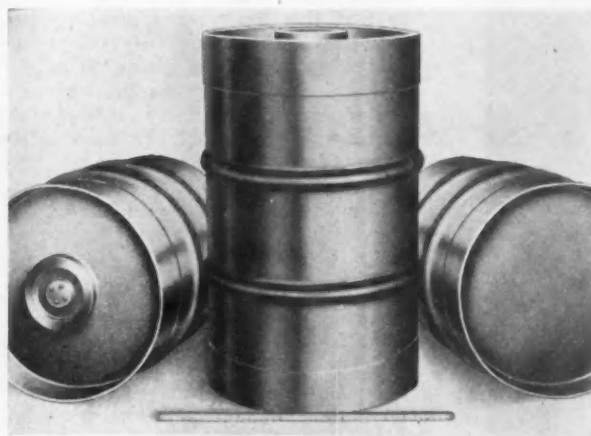


THE IRON AGE

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Rustless steel, aluminum and other resistant metals will compete with wood for the estimated domestic market requirements of 12,000,000 kegs. These are rustless steel drums used in Germany.

What Beer Means to Our Metals Business

By GEORGE S. HERRICK

RETURN of beer to legitimate markets of trade promises more than first aid to unbalanced Federal budgets and thirsty citizens. Many industries expect to benefit by the revival of an old industry, chief among them the producers and fabricators of steel, non-ferrous metals and alloys.

Metal has long been an important feature of the braumeister's art; possibly it should be amplified to "metal and cleanliness." A pamphlet entitled "Treatise On the Brewing of Beer," published in London, 1873, devotes many pages to advice on keeping utensils clean. "The copper," it is pointed out, "should be cleaned after each brewing as it will keep it bright, when it is used but seldom."

The "copper" refers to the large kettle in which the wort is boiled, and which then, as now, in most breweries is of sheet copper. Even today, reference to these utensils is to "coppers," for that metal and a few iron tubs used in mashing and sparging the malt were formerly about the only metals used in brewing.

In the past decade, or more, however, the ancient art of the metal-lurgist has been contributing new materials for the equipment needed by the equally ancient art of the braumeister. Rustless steel, nickel and its alloys and aluminum have joined copper and ordinary steel in European and other foreign breweries.

Equipment and modernization of breweries in the United States are ex-

pected to require many millions of dollars, but much of this expenditure, according to the brewers, themselves, will be from earnings and in consequence, spread over a period of years. However, absolute essentials of immediate increase in output promise to furnish a substantial market for equipment, and, in general, equipment in the brewery means steel, non-ferrous metals and alloys.

Large capacity tanks and vats comprise the major part of the equipment, and while considerable quantities of wood were used in the past for such purposes, the trend in brewing practice has been definitely

toward use of metals, such as stainless steel, nickel and its alloys, aluminum, glass-lined steel, copper and metal-lined concrete tanks. Copper is most widely used of all metals for the cooking kettles, because of its desirable heat conductivity.

The metal requirements of the brewing field are apparent from a few statistics on its pre-prohibition and post-prohibition condition. In the decade preceding prohibition, there were 1700 to 1800 breweries operating in the United States, the average being 1307, with the peak reported at 1847 in 1915, and the low for these ten years at 669 in 1919.

In 1914, according to Government statistics, the brewing industry represented a capital investment of \$858,861,000, and the average annual production in that decade, 1910-1920, was 57,308,476 barrels of 31 gallons each.

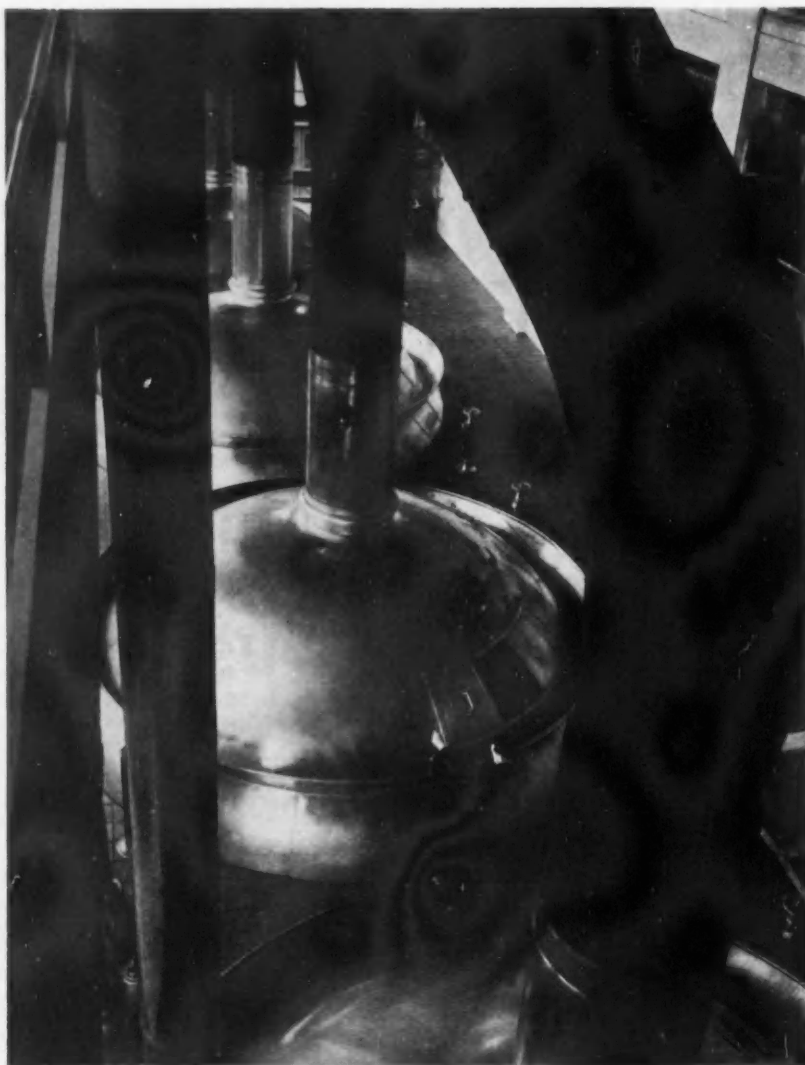
Today it is estimated by brewers and engineers in contact with the field that there are not more than 200 breweries available or operating under license, to which must be added an unrecorded number of illegally operated plants, most of which, however, are inadequately equipped and producing so-called "cold-water beer."

Based on these records of past performance, R. H. Huber, vice-president of Anheuser-Busch, Inc., St. Louis, and vice-president of the United States Brewers' Association, makes a conservative estimate of 40,000,000 barrels annually when beer is again legal. This is predicated on

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MANY new metals and alloys have been developed and have gained industrial acceptance since the enactment of prohibition. With the resumption of our brewing industry, following the legalization of beer, there will be extensive opportunities for plant modernization which will take advantage of these interim developments. Some of these are indicated by current European practice in those countries where brewing has not been interrupted. This article outlines some of the possibilities and probabilities of metals consumption in America with the return of beer.

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Fifty thousand lbs. of copper were required for each one of these four brew kettles with their steam and other ducts. This installation is in the Jacob Ruppert brewery in New York

66,105,455 barrels produced in the peak year, 1914, a 24 per cent greater demand through increased population (Bureau of the Census), or 81,970,764 barrels, halved by an estimate that the industry will revive less than 50 per cent in the first two years.

So it would appear that the brewing industry may to a great extent fulfill many of the expectations of metal producers, fabricators and builders of equipment for its use.

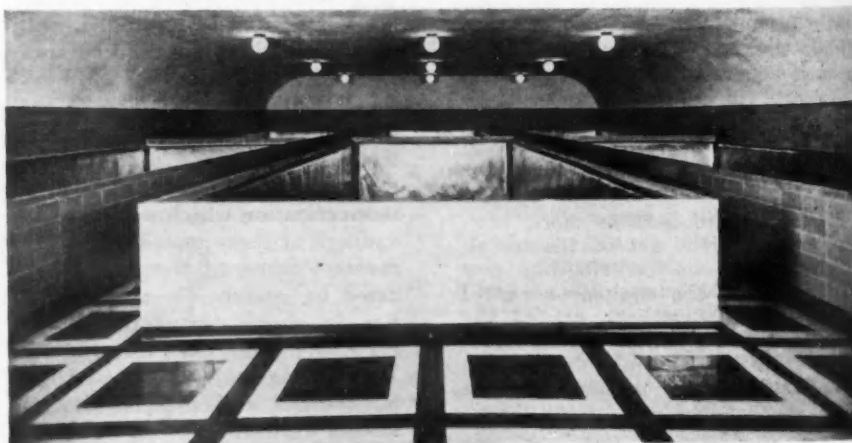
12,000,000 Kegs Needed

Metal instead of wooden kegs are being used by certain breweries in Germany and other foreign countries, a development of the past few years, which promises substantial tonnage business in this country when beer is legalized.

Even though the familiar wooden kegs of pre-prohibition days are generally readopted, the cooperage industries claim a survey indicates that 17,000,000 to 19,000,000 such kegs were in circulation prior to 1919, and that there are less than 200,000 beer kegs in the United States at present.

Based on the fact that about 75

per cent of all beer in 1919 was distributed in kegs of 31, 15½, 7½ or 3½ gallons capacity, it is estimated that 40,000,000 gallons of beer annually would call for about 12,000,000 kegs. With four steel hoops on each, there would be about 108,000 tons of strip steel used, not to mention steel dowel pins and rivets.



Stainless steel lined tanks in a tiled brewery room in Dortmund

Now, if these kegs were to be of rustless steel, aluminum, nickel or nickel-clad steel, it becomes obvious that substantial tonnages of metal would be required, not to mention considerable activity on the part of metal fabricating shops.

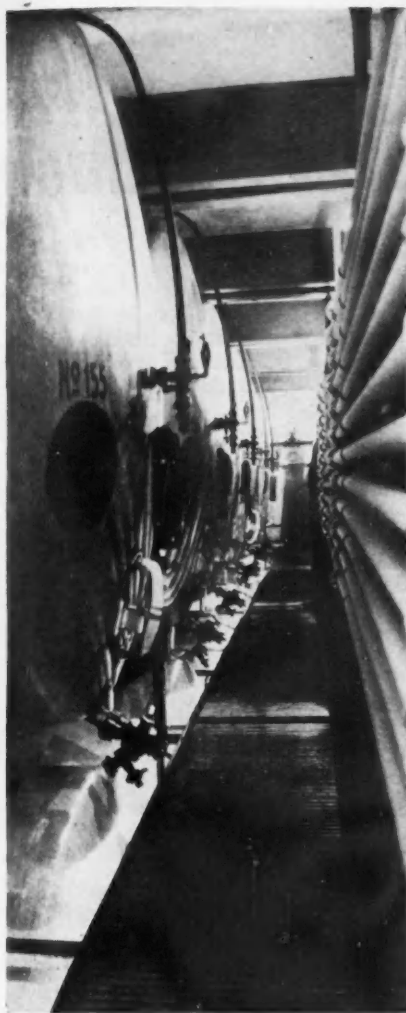
Brewery Tanks and Vats Large

Within the brewery itself, however, there is much heavy metal equipment in addition to piping, cooling and heating coils, filters, skimmers and small yeast tanks. It is the installation of this heavy equipment requiring the fabrication of sheets or plates, to which the attention of the metal industries is particularly directed as a prospective new field with tonnage requirements. Primarily, the heavy, large capacity units are the mashing and sparging tubs, fermentation vats, brew kettles and the storage tanks.

In addition to the heavy equipment, there are, of course, the filling and bottling machinery, washing equipment for kegs, labeling machines and small utensils, such as pails and dippers and the table tops in laboratories. It is in such small equipment, especially dippers, pails and similar objects, that the chromium and nickel plating fields may enter in supplying some material.

Even the existence and continued use of old wood tanks are expected by metal producers to result in some business from lining the wooden barrels and tanks with sheet metal. Then, too, certain breweries have used concrete storage tanks, which are lined with corrosion-resistant sheet metal, when the tank is poured. In general, however, storage tanks considered by brewers are likely to be of ordinary steel plate construction with glass lining, already in wide use; stainless steel, which has been found satisfactory in Germany; nickel or a nickel alloy, or nickel-clad plates, or aluminum. Both solid nickel and aluminum storage tanks have been used in England and on the Continent.

Nickel and nickel alloy, especially



Rustless steel beer storage containers in a Danish brewery

in the "clad" form, where 10 to 20 per cent of the total thickness of a steel plate will be pure nickel, rolled on, appears likely to be a considerable factor in brewery equipment of the new era. Then, too, there is Monel metal, which has been used in certain brewery equipment abroad and been found desirable for piping and similar purposes.

A possible new form of nickel for use in breweries is the alloy containing about 81 per cent nickel, 12 to 14 per cent chromium and 7 to 8 per cent iron. It was developed primarily for use in the dairy field, but its corrosion-resistant qualities and strength are such as to suggest that it will prove adaptable to the brewers' requirements.

Copper Widely Used in Brewing

Copper, along with iron, and later steel, was the original metal used in brewing for centuries, not only for the large kettles generally known as "coppers," but in most other equipment where the liquid is in motion. Piping of various diameters to transport the liquid from point to point in the processes, the heating and cooling coils and many other units of equipment are of copper and continued

wide use appears likely with the resumption of brewing in this country.

It is noteworthy that in Germany, where other metals and alloys have found acceptance, the breweries are said by the Metal Research Institute to be consumers of 1500 to 1600 tons of copper tubing annually, merely for ordinary purposes of operation.

That copper represents a substantial tonnage of metal in the average brewery is evident from the fact that a 700-gallon brew kettle with its steam and other ducts requires some 50,000 lb. of the metal in sheet form. Depending upon the size of a brewery, there will be from two to as many as six such kettles installed, ranging in capacities from 200 to 700 gallons each. It is estimated that in four kettles and for the piping, coolers, filters and other purposes in the Jacob Ruppert brewery in New York there is close to 500,000 pounds of copper.

After all, copper is certain to find wide continued application in breweries if for no other reason than that it has been used for generations and been found good and sufficient by brewers of the past.

Aluminum Also Used in Breweries

Still another metal has been found highly satisfactory for use in breweries—aluminum. Tests and long use in European breweries indicate that it has no effect on the taste, appearance, or other properties of beer, and its comparatively low cost is an additional factor in its use. It requires no lining or other coating to prevent direct contact with the beer, either when it is in motion or in storage tanks.

Aluminum equipment has been used by European and British breweries for long periods, according to the sellers, without appreciable deterioration, and in certain instances it has been in service for more than 20 years.

One of the principal uses for which aluminum is being recommended is in metal drums, the possible substitutes for the old-fashioned beer keg. As in the case of nickel and stainless steel, aluminum has been used by European brewers and has proved satisfactory in fermentation vats, storage, filling and water tanks, settling, pasteurizing, sugar cooking and dissolving apparatus, filters, ladles and gages. In the field of beer transportation, aluminum has served for metal drums and has been fabricated into railroad and truck tank cars and used for bottle crates and carriers.

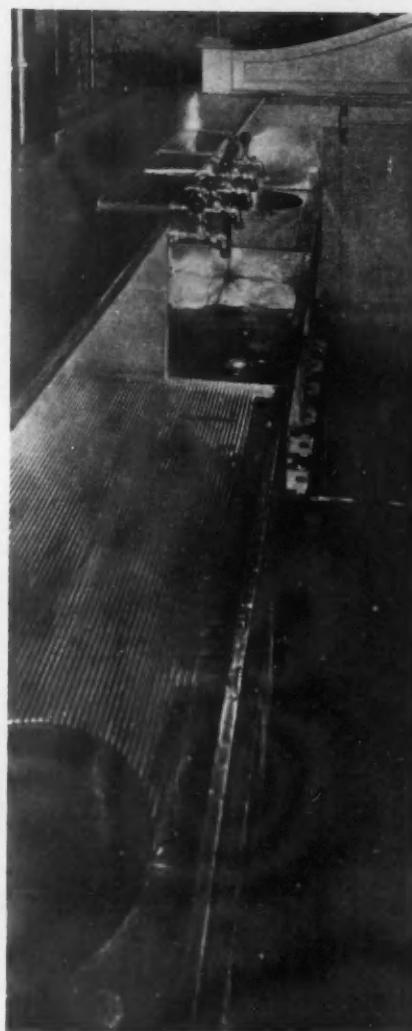
A fourth metal is coming into wider use today—rustless steel, the 18 per cent chromium, 8 per cent nickel alloy of steel. It has found its widest acceptance in Germany, but other foreign breweries have installations of this material, and there have already been a few small uses of rustless steel in American breweries.

The earliest tests of the high chrome nickel alloy steel were made by German brewers about 1921. Satisfactory results brought wider application and about 1925 the rustless alloy began to spread, not only in Germany but in German-made brewery equipment exported to overseas countries.

It has been used for tubing, large clearing, mixing, filling and storage tanks, as lining in fermenting tanks, and in fact rather generally throughout the brewery. The producers of the alloy are inclined to recommend it for any or all equipment. The storage tanks, which represent the really large tonnage use of metal in breweries, range in capacities in Germany from 2000 to as much as 40,000 gallons, with the average capacity from 6000 to 8000 gallons. These capacities are comparable to the sizes of storage tanks in existent American breweries.

A typical installation in a modern German plant of medium size in-

(Concluded on Page 482)



Outlets for metals will exist in the distribution as well as the manufacture of beer. Monel metal drainboards, sinks and other surfaces are seen in this bar in the Hotel Invermay, Vancouver, B.C.

Welding in the Steel Industry—R

FROM time immemorial there has been no basic change of principle in design of sheet and tin mill housings. The same breakage troubles occur year after year, and still no one has come to the front with a well-thought-out cure.

The contours of roll necks have gone through an evolution, but the designs of housings remain the same. No particular location on these housings has been immune from breakage, and we have gone merrily on and just changed housings, replacing them with another one of the same faulty design. This procedure is accounted for more or less by no housing breaking consistently in any one given location, and, while this fact in itself is very mysterious, it is highly accentuated by the fact that the break generally shows clean metal. As these breakages occurred, designers, from time to time, have added additional sections to the outside contour of the housing, but this has in no way proven a cure-all.

Some years ago the author corrected roll breakage by taking out metal, and it will be shown later in this article that such a procedure will lead to a solution of this mysterious breakage difficulty in housings. It is to be noted at this point that the

By **WILLIAM H. WARREN**
Vice-President, Lukens Steel Co.,
Coatesville, Pa.

design of the housing as a whole has been influenced by these mysterious failures, and while it is entirely possible that the housing as a whole is too strong, yet the housing locally is too weak. By increasing the local strength we are in position to decrease the average strength, and thereby effect economical changes.

Celluloid Models Used to Arrive at Rational Design

Use of celluloid models, in an effort to arrive at a rational design, cannot be too strongly recommended. A transparent celluloid model under stress will give an accurate picture, through the use of polarized light, of the stress distribution encountered in any given physical shape. The same celluloid model, when subjected to a certain technique, will very completely show the behavior of the structure as a whole, and, what is most important, will take into account whatever rigid joints may exist. This is quite important, as it is well known

that the subject of rigid frames is extremely difficult to handle analytically.

Fig. 1 depicts the general manner of construction. The very irregular inner contour is the conventional method by which the brasses holding the rolls have been mounted. Fig. 2 shows a model of the same structure illuminated by polarized light when under stress. It can be seen that there are 14 possible places at which a fatigue crack may start. Measurements of these high local stresses show that the maximum stress may be as much as six times the average stress, and we are immediately confronted with the question that once having eliminated these high local stresses, how much can we reduce the weight of the structure as a whole.

Irregular Inner Contour Eliminated

Let us consider for the moment a frame or housing proper with this irregular inner contour eliminated.

Fig. 3 is a photoelastic picture of this same housing with its interior profile smoothed out by eliminating the chuck mountings. It will be shown later that these chuck mountings can be produced, by means of welding, in such a manner as to make the inner

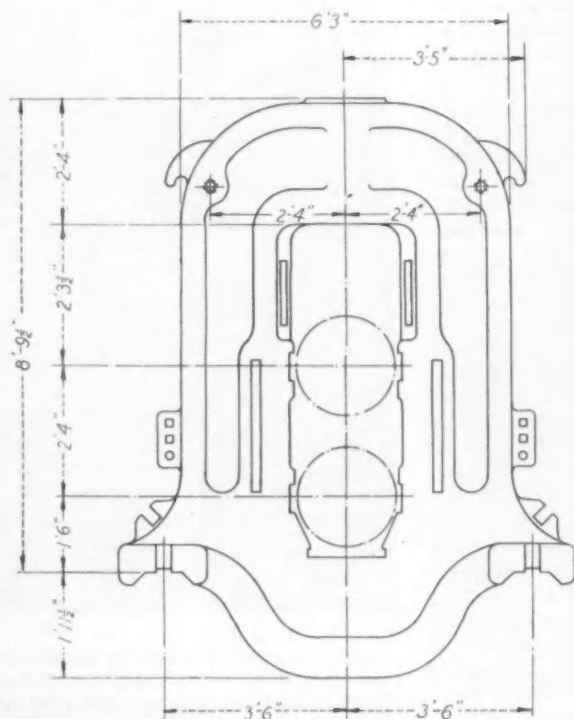


Fig. 1.—Sketch of roll housing showing irregular inner contour.

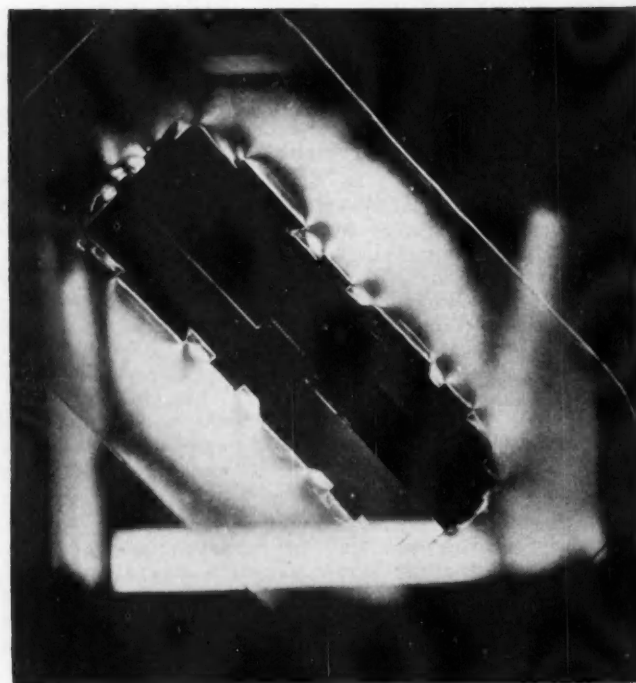


Fig. 2.—Celluloid model of structure shown in Fig. 1, illuminated by polarized light when under stress.

stry—Rational Design as Applied to Mill Housings

contour of the housing effectively smooth.

We are now confronted with the problem of analyzing this housing as a rigid frame. It is generally conceded that the ideal structure is one in which the average stresses at any one point are no higher than the average stresses at any other point. When we look through the various sections of an average mill housing, we find that the shoulder holding the housing nut is only one-fifth as strong as the gross section through the side of the housing, which is far from being ideal. The glaring inconsistency in this design can be brought out at this point by noting that the shoulder holding the nut never fails, while the failures that have been experienced have all been through the gross sectional parts of the housing. It is, therefore, reasonable to assume that having eliminated the causes of the failures through the sides and bottom, as shown in Fig. 2, it will be possible to reduce the total weight of the housing considerably by proceeding with a free mind to design this housing as a structure known to be free from local weaknesses.

Due to the fact that the loads on a "jump" mill are very indeterminate by the very nature of the impact

PHOTOELASTIC studies of stress distribution in mill housings reveal local stresses that may be as much as six times the average stress. Adding metal to the outside contour has not cured the mysterious breakage. By eliminating local weaknesses, however, the service life of the housing may be greatly extended and the weight considerably reduced. With a service life of eight to 10 years, the welded steel housing developed from these studies is a source of definite economies.

This article, the first of five on the subject of "Welding in the Steel Industry," by Mr. Warren and another authority, is one of the papers submitted for the second arc welding prize contest sponsored by the Lincoln Electric Co., Cleveland

loading and temperature effects, it will be impossible to easily predict what maximum load this structure will have to stand. It will be necessary, therefore, to be guided by past

experience. Since we have eliminated localized weaknesses, we are in a position to compare the average strengths of various component parts with a view to finding the weakest average section which has stood up in service. If we now design a frame in which the stress at any point does not exceed the rupturing stress of this weakest serviceable section, we have a rational method along which to proceed. Simple calculation shows that the shoulder on the nut is the weakest section upon which we can depend for average stress. We are thus confronted with the problem of producing a frame which will self-contain this minimum serviceable load.

If we take into account, in the design of this frame, the fact that the joints in the final structure will transmit bending moment, we find ourselves solving a problem which is statically indeterminate. The solution of such a frame can be laboriously worked out by the use of Clapeyron's Theorem of Three Moments, but it is much easier to make use of celluloid models, to which, through a microscopical study, can be applied Maxwell's Reciprocal Theorem. This theorem, and its application to celluloid

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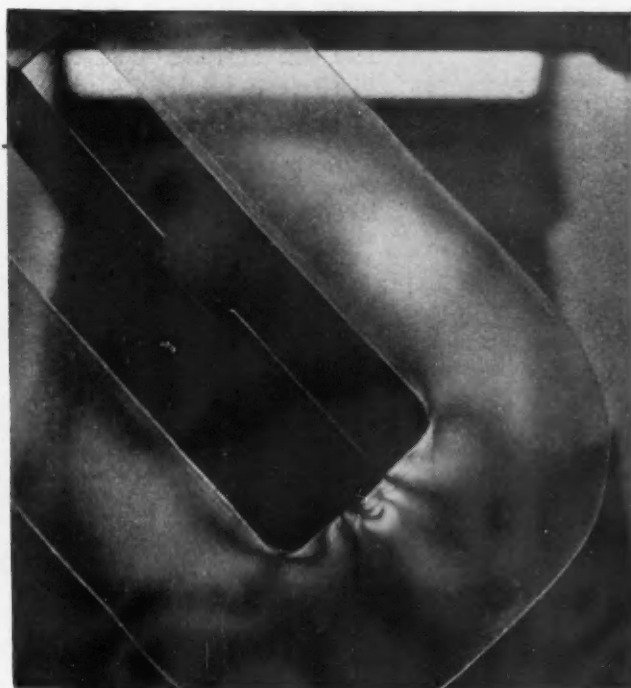


Fig. 3.—Photoelastic picture of housing with interior profile smoothed out by eliminating chuck mountings.

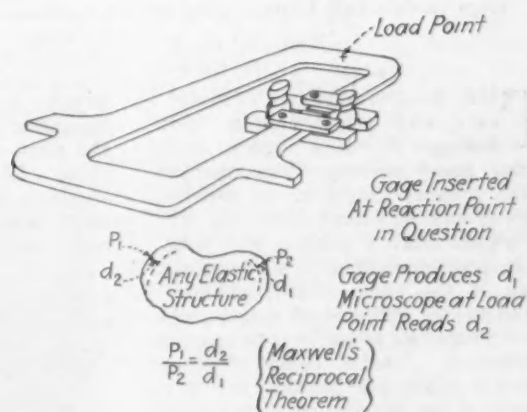


Fig. 4.—Application of Maxwell's Reciprocal Theorem to celluloid models (of structure).

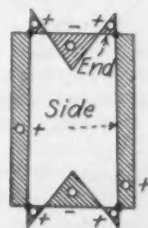
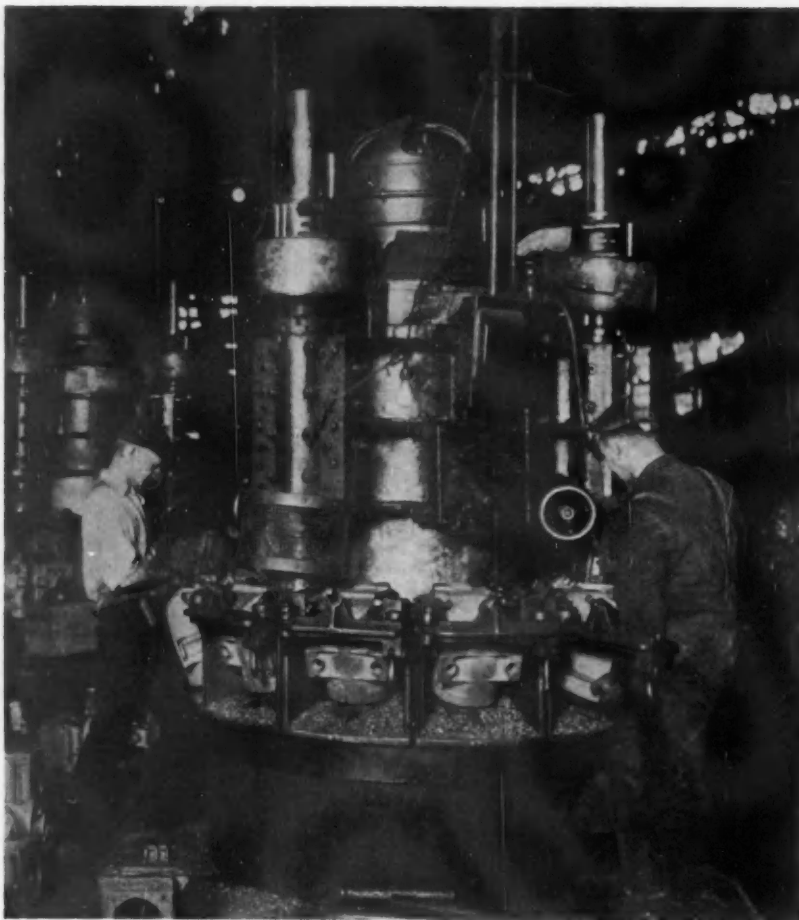


Fig. 5.—Bending moment diagram as shown by celluloid model.

Mass Production Methods for Malleable



Large, specially built 12-stage milling machines complete the machining in one cycle.

THE changes in design of freight cars and other rolling stock during recent years have caused many corresponding changes in the foundry industry. In general, railroad castings have moved up into the higher quality grades, with alloy steels and malleable predominating. Some of the parts have been redesigned to use rolled steel shapes, and no single design today is permanently established. Journal boxes of many different types are in use, but production of the type to be described in this article runs into hundreds of thousands, making it possible to place its manufacture on a mass basis in line with good practice in most any other field.

The plant here referred to was laid out with the definite prospect of producing established products and it was therefore possible to keep the path of travel of parts in process to a minimum. Storage bins served by a railroad siding are located close to the melting furnaces. Roller con-

veyors, cranes, and tractors pick up the materials and carry them through the plant with but little manual handling. In the production operations specially designed labor-saving equipment and short-cut methods have been generously used.

An interesting case illustrating this is found in the core room. Under full operation this department has produced some 40,000 cores a day with a total force of core makers of 37.

A special steel-top circular table is provided for each core maker and the location of these tables in respect to the ovens has been worked out to provide maximum convenience. Carefully prepared core sand is delivered to the circular tables from overhead spouts. Each core maker receives his sand at his right, fills his cores in front of him, and then places his completed cores to his left, but instead of moving the cores away from him as he completes others, he himself moves around the table to the right, using up the sand ahead of him

THE inevitable jolts in freight-car operation make it advisable to use malleable and steel castings for couplers, journal boxes and many other parts. Hundreds of thousands of malleable journal boxes are required to fill the needs of American railroads. This high demand has made it possible to put operations on a highly efficient quantity production basis. Some of the features at one large malleable foundry are described in the accompanying article. The description is of actual operations, but the name of the foundry is withheld by request.

and leaving behind a string of completed cores. Before he makes the full circuit these completed cores are collected by a special handling gang using the rack car train shown in one of the illustrations. This train operates on narrow-gage tracks set into the concrete floor and serving all of the core makers' stations. The tracks extend into the various core ovens so that, having once placed the cores on the trays of the trailer cars, it is unnecessary to disturb them until they are baked and delivered to the foundry floor. Long trains of six or eight cars of cores are shifted by means of small storage battery tractors, one of which is shown in the illustration.

Reserves Held to a Minimum

In the core department as in all other departments of the plant the stocks of material in process are held to the absolute minimum. A somewhat unusual policy has been developed to make this possible. Each day, foremen on the foundry floor turn in requisitions for cores and other materials required on the following day. These requisitions are accurate and are based on an intimate knowledge of the orders in process and the established rate of production. They go direct to the planning department where they form the basis of production schedules and of orders sent to the other departments. If a department, for instance, changes its product from a small to a large casting, the changed requirements for different materials are estimated and orders given to supply the new demand. It may be that an extra man may be required in the shakeout gang. More fuel, more

Malleable Castings

By HERBERT R. SIMONDS

scrap, or more pig iron may be needed. Perhaps the changed work will call for a larger supply of molding sand, and the man in charge of the preparation and delivery of such sand receives his new schedule and adjusts his production rate accordingly.

When the foreman of the core department receives his output schedule he immediately adjusts his production to fit it, making allowance for any under- or over-production on the previous day. Variations in labor requirements are taken care of by shifting men from one department to another, and because of the large scope of operations there is sufficient flexibility to make the daily scheduling practicable. The core makers operate on a combination standard and bonus system of pay, the actual rate of bonus changing each month for the entire department in accordance with variations in the percentage of rejections. On extremely small cores, girls have been found more efficient than men, and when the force stood at 30 core makers, 10 of these were girls.

Material Handling Simplified

Molding sand is handled and conditioned by a night gang. A machine cutter is used for the sand along the uninterrupted aisles of the main floor. At other places cutting is done by hand, and the actual conditioning

continues throughout the day with new sand available to each molder if desired. The floor sand is gathered up from time to time and tempered and mixed with new sand and bonding materials in the usual way. Normally the consumption of new sand

averages 350 lb. per ton of good castings.

Sand is received in drop-bottom cars on an elevated spur from which it is dumped into 750-lb. trailer cars. These are taken by industrial tractor to final destination in the plant. When the plant was operating at full capacity, two men with this equipment were able to handle all the sand used by the molders and two other men handled the sand used by the core department.

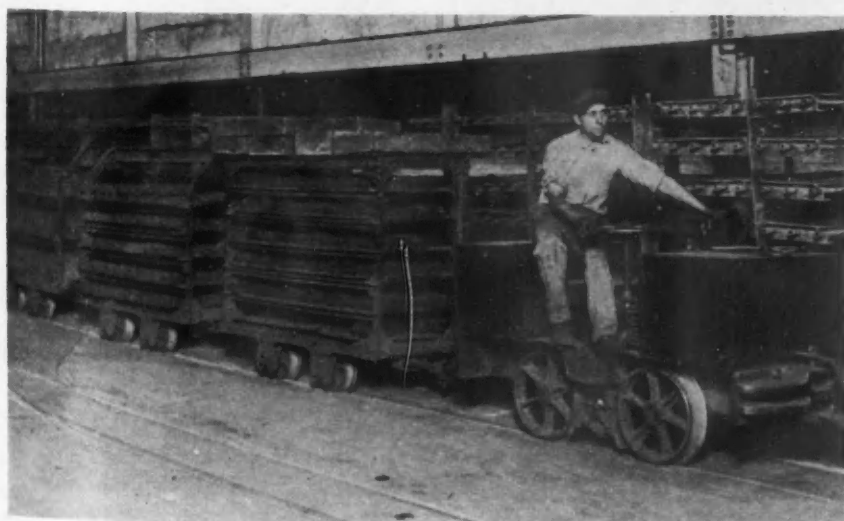
The sand mixing and treating is done on a level below the main foundry floor. From that point small bucket elevators carry the treated sand to a distributing system from which it passes into hoppers located at each molding station.

Miscellaneous materials, including fuel, are handled by means of small steel open-box trailers equipped with hard rubber tires and hauled by electric tractors. These material trains travel on well marked aisles throughout the plant and congestion is avoided by having the aisles all arranged for one-way traffic.

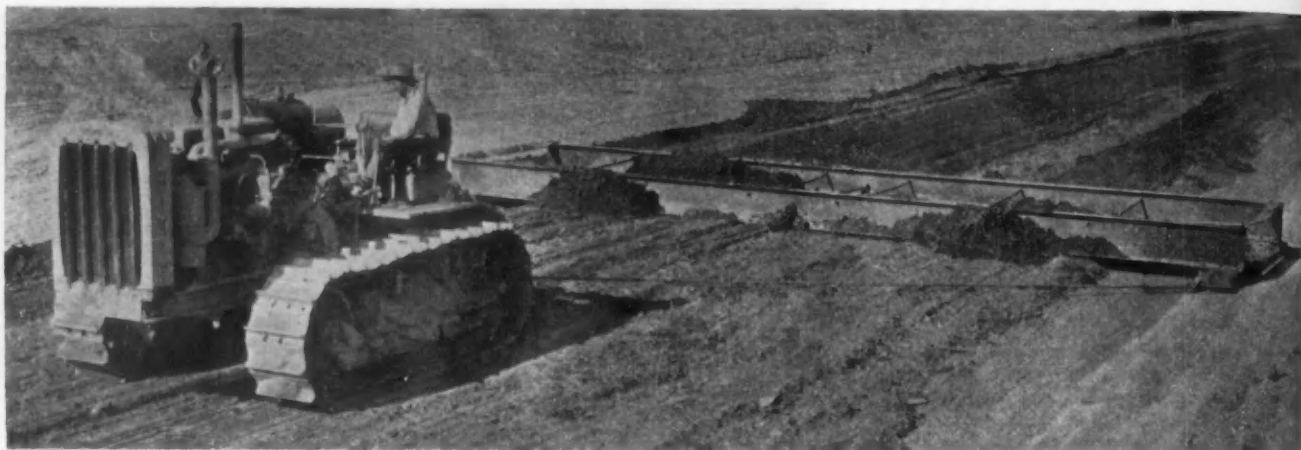
The scrap and pig iron storage
(Concluded on Advertising Page 10)



Flasks are of uniform design with lugs for handling and rims to take clamps. The copes are reversible.



Steel rails imbedded in the concrete floor make a smooth track for core handling.



Caterpillar Diesel pulling a 5-ton drag to level the new air field (Bolling Field, Va.) just outside Washington, D. C. The drag was made by Mr. Farrow of the Arundel Corpn. of 16-in. channel iron and is 35 ft. long.

Selection and Heat Treatment of Steel for Caterpillar Tractors

By G. C. RIEGEL
Chief Metallurgist
Caterpillar Tractor Co.
Peoria, Ill.

MOST manufacturers are aware that the interruption of the steady flow of manufactured product is one of the most serious causes of losses, due to lowered shop efficiency, relative increase of fixed charges per unit of product, and the loss of sales through non-delivery or slow delivery. Not every manufacturer has gotten down to the fundamental causes of interrupted production of which he has control but has too often assumed that things would "iron" themselves out. As a matter of fact, even most diligent study and effort in one's own plant is many times insufficient to bring a remedy for production delays and stoppages unless the cause is traced back to the origin of the material. On the other hand, we do not wish to under-emphasize the importance of a manufacturer's first "setting his own house in order" before looking elsewhere for trouble.

But, let us assume that the production rate for a certain group of forgings is continually falling short of requirements. In such a case the actual rates have been set for the worst conditions being encountered. Thus, in machining a nickel steel gear blank, it was found that the automatic lathe was only doing one-half of what was required by the remainder of the machine line.

Investigation disclosed that the microstructure was a great variable in the annealed structure of the blanks. Hence, the machining pace was set for the worst. Beginning at the steel mill, testing for inherent chemical and physical characteristics before rolling, changing the forging

process from batch heating to continuous heating, limiting the size of the stock for the upsetting operation, designing furnaces for controlled heating and cooling rates, we have been able to produce a definite and consistent microstructure with a corresponding narrow hardness range, thereby enabling the shop to more than double its previous production rate on the slowest machining operation.

This, however, was only an indirect benefit, or by-product, of the primary purpose to which we have set ourselves of producing a stronger and better gear. On this point, we shall elaborate.

Failure of Gears Investigated

About seven or eight years ago, sporadic trouble was encountered with failure of a final drive gear on one of the largest tractors. Knowing that

the majority of these gears served satisfactorily, our metallurgical department insisted that the forging source keep the product of mill heats separate and that they be correspondingly marked. While forging quality alloy steel had been used conforming to the limits of S.A.E. chemistry, yet some 40 pieces out of one mill heat gave trouble in service over a period of two or three years.

From these unsatisfactory gears, and from gears out of a mill heat which had given no trouble, samples were taken for examination. The examination consisted in fracture tests, hardness uniformity, etch tests, micro-cleanliness, impact tests, and tensile tests. The impact tests were cut from the gears, without annealing, by the use of rubber-bonded saws and by finishing the specimens by grinding. The tensile specimens were cut from the annealed gears and subsequently treated to the same hardness as that in the gears. A number of questionable facts were found in the gears from the mill heat from which the failures had occurred. What the tests disclosed is shown in the table below.

RESULTS OF TESTS

GOOD GEAR.		POOR GEAR
Velvety	Fracture	Dry, finely crystalline
Total range, 3 points	Hardness	Total range, 5 points
Rock. "C" on section		Rock. "C" on section
Flow lines symmetrical	Etch	Non-symmetrical
Fairly clean	Micro-cleanliness	Considerable non-metallics
Mostly above 5 ft.-lb.	Impacts	All below 5 ft.-lb.
R. of A. above 27 per cent	Tens. tests	Little reduction and mostly flat breaks

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EXPERIENCE of a builder of large tractors in selecting methods and specifications for the control of the quality of steel purchased and for its heat treatment is related in this article. The company's method of controlling heat treatment and the equipment used are also discussed. The article is based on an address by the author before a meeting of the Tri-City chapter of the American Society for Steel Treating at Moline, Ill.

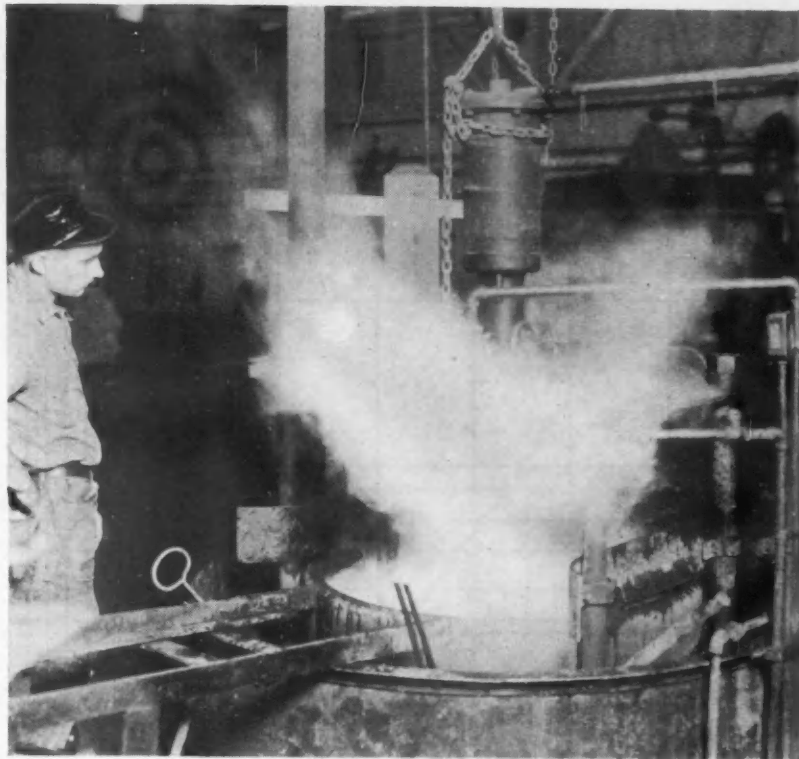
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You will notice that I have mentioned positive as well as negative evidence from actual service tests. One may easily be misled by ignoring positive evidence of service. Parts which "stand-up" in service may be no better than some which fail unless we know by tests. Likewise, we may use entirely too expensive material or methods, unless we know these limitations.

Controlling Steel Quality

Again, sweeping conclusions must not be adduced from too little experimental evidence. As has been said, "One swallow does not make spring," or "a drink," as the modificationist quotes it. It was not, therefore, immediately possible to put into practice the restrictions which seemed ad-

visible to us in controlling steel quality at the sources. A number of mill heats from several mills were tested by these standards. Fortified with this accumulated evidence, it became possible to go to the mills and ask for the kind of steel which gave the satisfactory performance.



Quenching final drive sprockets for tractors.

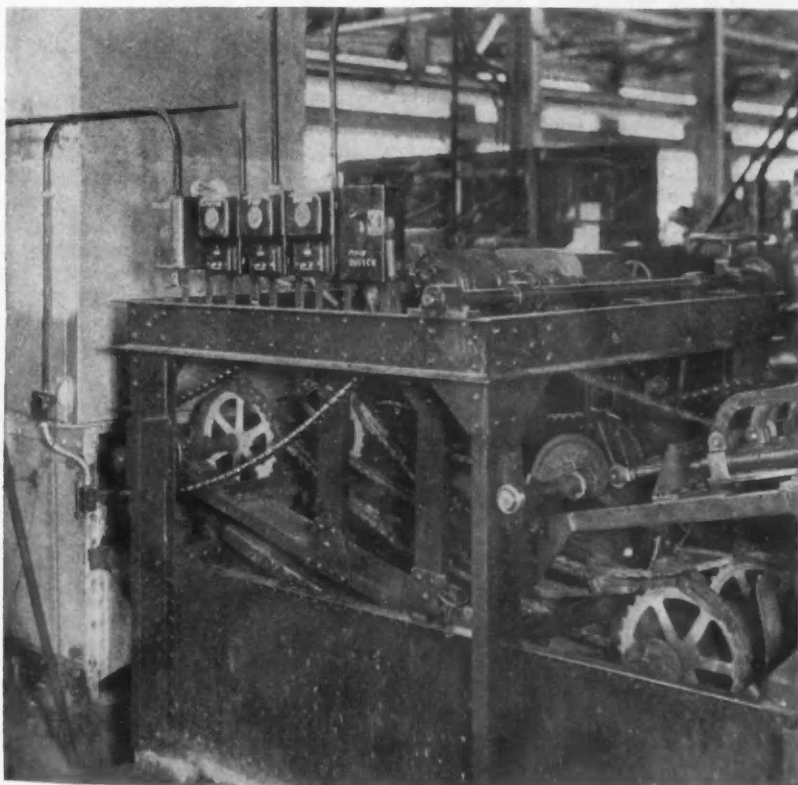
With due regard to the more helpful and cooperative spirit of the steel manufacturers today, we were considered at that time to be asking a most impracticable procedure. Our executives asserted that we wished to buy steel by mill heat lots, that we should receive samples from the bottom of the first ingot after the usual discard, and in a like manner from the top of the last ingot, thus representing, as we hoped, the minimum of quality to be applied on our orders.

Minimum Requirements Set Up

After upsetting the flow lines in these steel samples (billets), we proceeded to take specimens from the "centers," which gave us flow lines transverse to the length of the specimens. From these values, we attempted to set up our minimum requirements. Anything above these minima should, of course, be the constant aim of the steel source to furnish. We are glad to state that, on more than one occasion during the several years in which such steel specifications have been in effect at the mills before the steel is rolled on our orders, the steel manufacturers have agreed to further restrictions and the raising of the minimum values previously called for.

Typical of such specifications are those reported by the speaker in THE IRON AGE of Dec. 3, 1931, for S.A.E. No. 1045 steel. The majority of our purchases of carbon steel are based on such restrictions and all of the alloy steel for gears, pinions, etc., are so restricted. To illustrate how this applies to S.A.E. No. 2345 and its

(Continued on Advertising Page 12)



Continuous mechanism for chain belt link hardening furnace, showing discharge into draw furnace elevator.

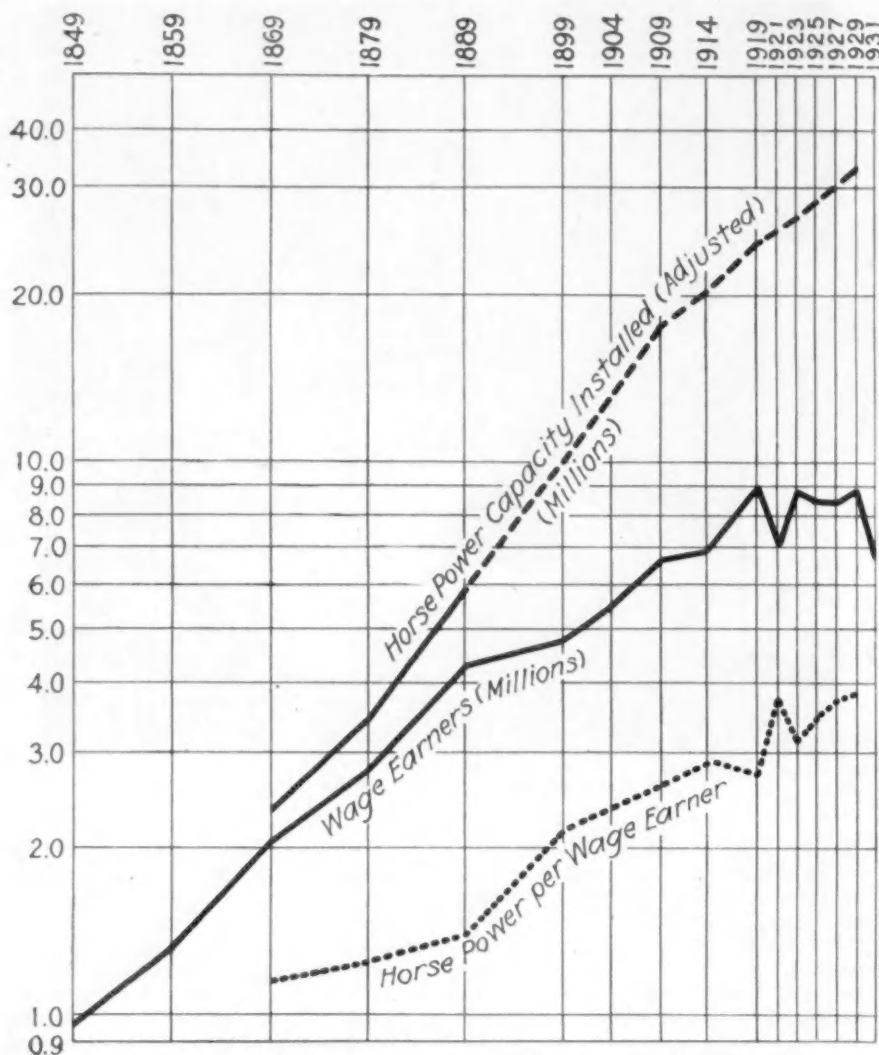


Chart 20—The Growth of Mechanization as Measured by the Application of Power

What the Machine Has Done to Us

By WALTER S. GIELE

DEXTER S. KIMBALL, Dean of Engineering at Cornell University, has pointed out that the transfer of skill from the man to the machine rather than the application of power has been the significant thing about the mechanization of industry. The application of power to manufacturing processes is, nevertheless, a quantitative measure of the extent to which that transfer of skill to the machine has been found profitable and is also a quantitative measure of the growth of the investment in manufacturing equip-

The Growth of Mechanization as Measured by the Application of Power in the Manufacturing Industries of the United States

	1849	1859	1869	1879	1889	1899	1904	1909	1914	1919	1921	1923	1925	1927	1929	1931
Aggregate hp. capacity—millions																
Hp. capacity of motors driven by current generated within plant—millions			2.346	3.411	5.939	10.098	13.488	18.675	22.291	29.328	31.211	33.094	35.733	38.826	43.079	
Hp. capacity of motors driven by purchased current—millions							1.151	3.068	4.939	6.969		8.822	10.255	11.220	12.376	
Hp. capacity of electrified equipment—millions							.442	1.749	3.885	9.283		13.366	15.869	19.132	22.776	
Hp. capacity of prime movers in factories—millions							1.593	4.817	8.824	16.252		22.188	26.124	30.352	35.152	
Adjustment for excess of motor over generator capacity—millions								18.406	20.041			19.729	19.904	19.693	20.155	
Adjusted aggregate hp. capacity—millions							.454	1.360	2.060	4.520		5.560	6.510	7.620	8.890	
Wage earners—millions	.957	1.311	2.054	2.733	4.252	4.713	5.468	6.615	6.896	9.000	6.947	8.778	8.384	8.350	8.836	6.512
Hp. per wage earner—unadjusted			1.142	1.248	1.397	2.145	2.465	2.825	3.235	3.333	4.495	3.770	4.265	4.648	4.875	
Hp. per wage earner—adjusted							2.383	2.620	2.935	2.756	3.765	3.135	3.490	3.740	3.853	
Per cent. of total hp. capacity																
Motors driven by current generated within plant							6	12	16	17		19	21	21	21	
Motors driven by current purchased from outside sources							3	9	17	38		41	44	49	53	
Total electrified							9	21	33	55		60	65	70	74	
Non-electrified							91	79	67	45		40	35	30	26	
Total horse power							100	100	100	100		100	100	100	100	

Sources—Bureau of the Census—see Statistical Abstract, 1932, p. 348, 730, 732; Commerce Year Book, 1932, p. 218; 1921 interpolated.

THIS is the sixth installment of Mr. Giele's series embracing a factual study of mechanization and employment. In this chapter the author deals with mechanization and investment over the long term period and their relation to collective and individual employment.

One significant fact revealed in this article is that the period of most rapid advance in mechanization was not the past decade, 1920-1929, as generally supposed, but the decade of the 1890's.

ment that has come with the transfer from hand to machine production.

Chart 20 illustrates the course taken by the application of power in the manufacturing industries of the United States, both as a whole and on a unit or per wage-earner basis. Before proceeding to the detail analysis of this chart it will be necessary to give consideration to the fundamental changes which have taken place in the method of generating, distributing and applying power to industrial processes.

Chart 21 shows, first, the gross total horsepower capacity of prime movers installed in the manufacturing plants of the United States plus the gross total horsepower capacity of motors operated on current purchased from outside sources.

The Excess of Motor Capacity Over Generator Capacity

Where individual motors are installed to drive single machines or groups of machines the aggregate horsepower capacity of such motors is greater than the capacity of the prime movers which drive them as, obviously, not all the motors connected will operate at full load capacity at any one instant. In fact, this is one of the incidental advantages of the electrical transmission of energy.

In order, therefore, to arrive at a more nearly accurate measure of the extent of the application of power and to obtain figures which will be comparable throughout the range of this study it is necessary to compute adjusted figures to compensate for the excess of motor (connected load) capacity over generator (prime mover) capacity. The United States Bureau of the Census has computed an average figure of 72 per cent of aggregate motor capacity in estimating corresponding generator capacity. This adjustment has been applied to that portion of the power capacity which is represented by motors operated on current purchased from outside sources.

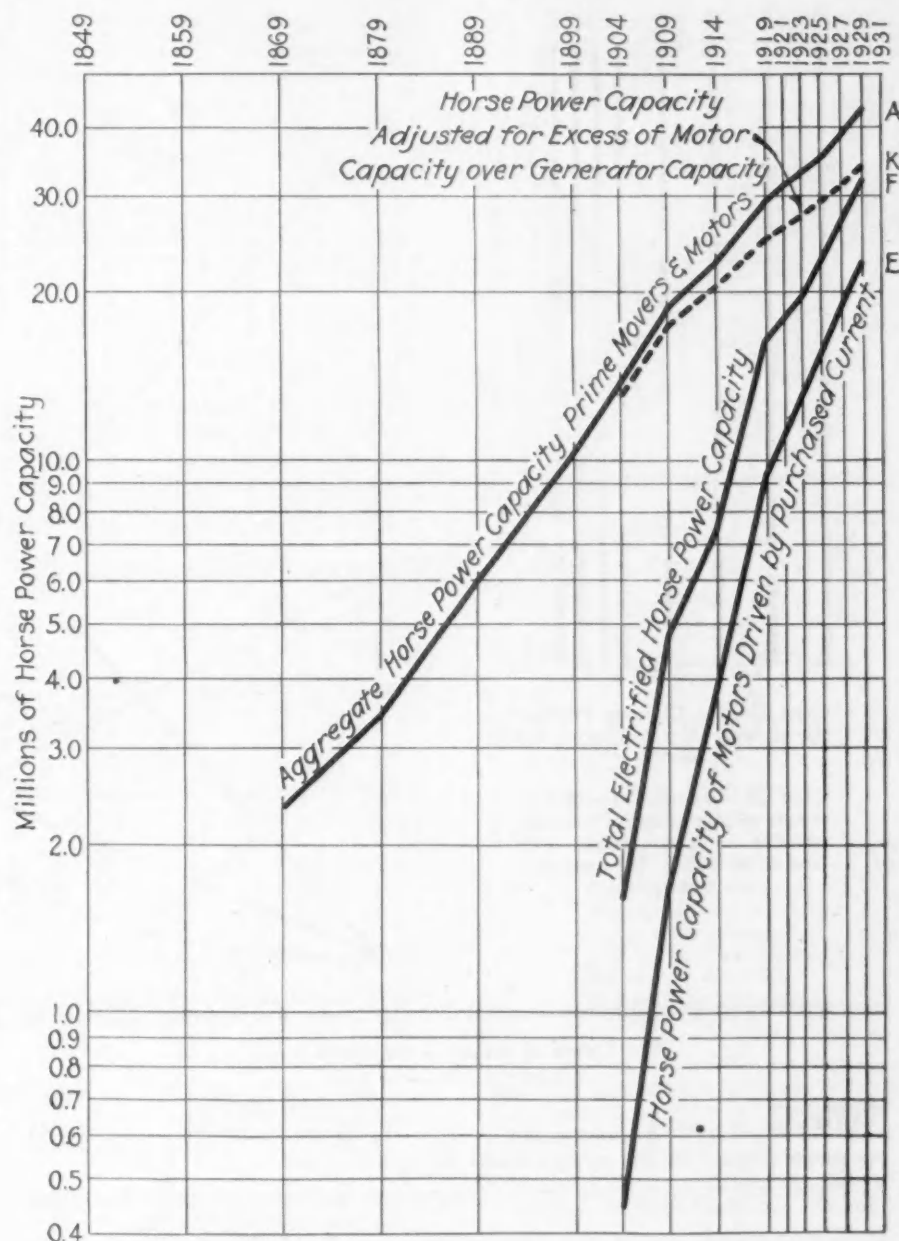


Chart 21—The Growth of Installed Horse Power Capacity by Classes

Electrification has made rapid progress since the turn of the century. The relative slope of the lines representing the total power and electrified equipment respectively illustrates this fact graphically.

Even more rapid was the development of the relative amount of current supplied to manufacturing industries by the public utilities as shown by the line representing motor capacity operated on current purchased from outside sources.

The development of alternating current apparatus with its advantages in long-distance transmission and facility of transforming from higher voltages to lower has been a factor in this growth.

The rate of expansion in the use of purchased current was highest from 1904 to 1909. A distinct retardation is evident for the succeeding period 1909 to 1919, and an even

more marked and further retardation of rate for the period 1919 to 1929.

It seems probable that some of the larger users of power found it economical to generate their own, especially where waste steam could be utilized or where exhaust steam could be applied to heating or to manufacturing processes. This is a neat illustration of an application of the law of diminishing returns.

Chart 22 shows the changes in the relative proportions of power generated by prime movers and mechanically transmitted within the plants that use it, power obtained from current purchased from outside sources and power generated and electrically applied within the manufacturing plants.

The arrangement of items in this chart has been varied from the arrangement in that shown in Fig. 21 in order to show more clearly the

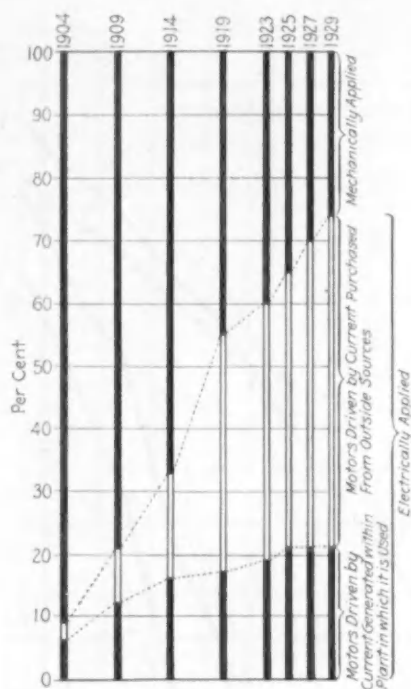
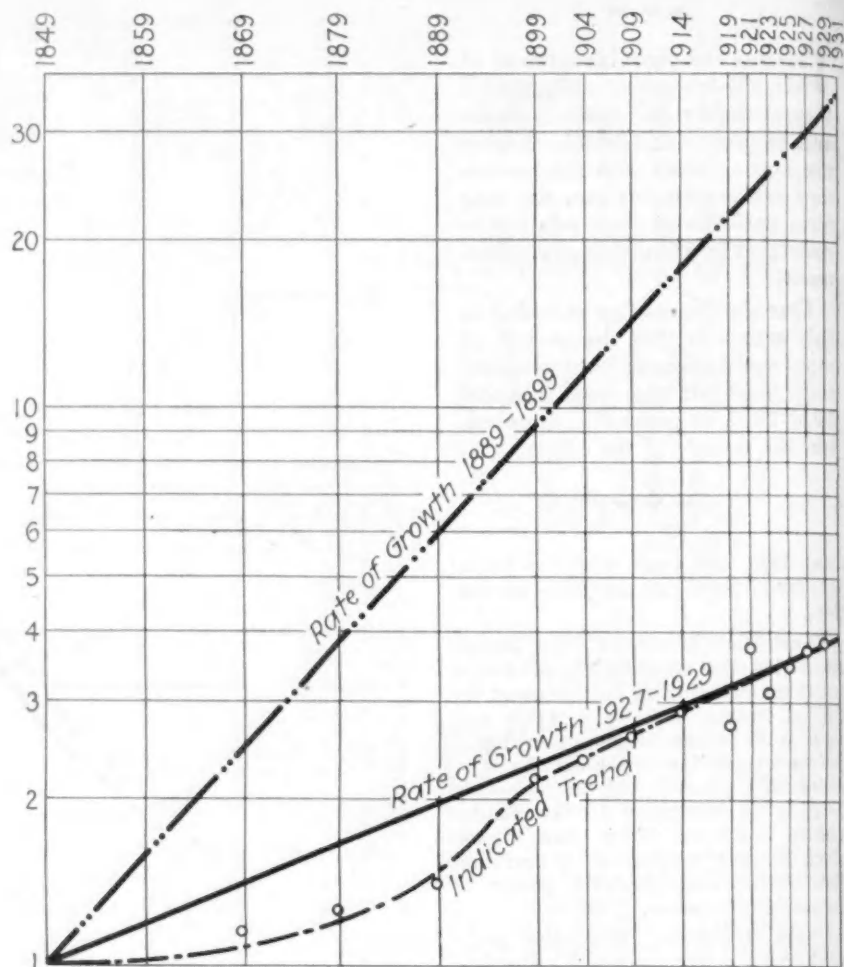


Chart 22—The Changing Distribution of Power as to Application and Source

Chart 23 (at right)—Comparison of Rate of Mechanization in Manufacturing in Last Decade with That of the 1890's (H.P., adjusted, per wage earner)



The Growth of Wealth in the United States				
	MILLIONS OF DOLLARS			
	1900	1904	1912	1922
Grand Total				
All Forms of Wealth	88,517	107,104	186,800	320,804
	2,541	3,298	6,091	15,783

Source—Bureau of the Census—See Statistical Abstract, 1932, p. 271.

relative stability of the proportion of electrically applied power generated within the users' plants.

Having analyzed the component items we may return to a consideration of Chart 20. We note first, that, after adjusting the gross figures to allow for the effect of the change toward electrical distribution, the power capacity increased in fairly uniform geometrical progression (i.e. was compounded annually) 1869 to 1909 and again in fairly uniform geometrical progression 1909 to 1929. The rate of increase was, however, distinctly slower in the latter period than in the former period.

The Power Capacity Per Wage Earner

The more significant measure, however, of the progress of mechanization with respect to the application of power lies in the unit figure on a per wage-earner basis.

The suggested trend of mechanization as measured by the application of power per wage-earner is shown

in Chart 23, which is derived from Chart 20, and based, therefore, on the adjusted aggregate horsepower. The general characteristic is that of the well-known "S" curve. It is probable that this is in fact a composite of a series of successive and overlapping "S" curves reflecting, for groups of enterprises, the successive rise and relative decline of major developments. Such major developments would be, for instance, the introduction of the electrical transmission of power or the development of scientific management, interchangeable manufacture and so forth.

The deviation from indicated trend in 1919 does not represent a relative reduction in power capacity. It represents an abnormal increase in working forces which came with the two and three-shift operation common in so many industries at that period. The quotient horsepower per wage-earner was reduced by an abnormal and temporary increase in divisor rather than by any significant change in the dividend.

So, too, the deviation in 1921 reflects a drastic reduction in working forces rather than an abnormal increase in power application. Wage-earners were laid off but equipment already installed remained.

Maximum rate of power application occurred in the depression decade of the 1890's, not in the period 1927-1929, the culminating years of our biggest boom. In fact, should we draw a line through the abnormally low point in 1919 and 1929 we would still find such a distorted rate for that decade lower than the indicated rate for the 1890's.

The portion of the curve representing the development since the turn of the century, while nearly flat, is convex upward, as indicated by the tangent drawn through the points at 1927 and 1929. This characteristic suggests a decreasing rate in the progress of the application of power on a per wage-earner basis.

The Increase in the Provision of Invested Capital Per Wage-earner

Another aspect of the growth in the provision of power to supplement the physical effort of the wage-earner is in its implication with respect to the invested capital provided per wage-earner. Power is provided for the sole purpose of driving the machines of production. The growth in power generating capacity is, there-

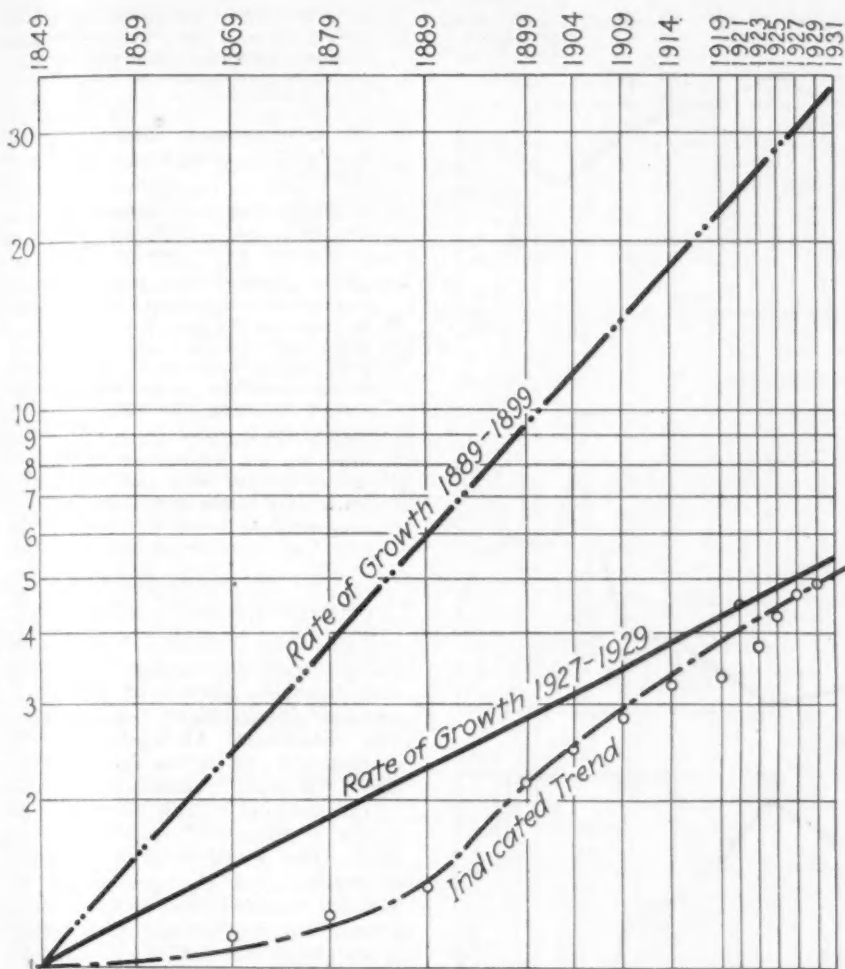


Chart 24—Trend of Investment in Manufacturing Equipment, Past Decade Compared with 1890's. (Indicated by H.P. per wage earner)

fore, roughly a measure of the growth in the production machines of every sort that are to be driven by that power; a measure not only of their numbers but also in a general way of their productive capacity and of the capital investment they represent.

The dollar value of the capital investment in any enterprise or group of enterprises, whether appraised on a basis of first cost less depreciation and obsolescence or on a basis of replacement, must vary with the price level. The decision whether or not to install additional or improved equip-

The Growth of Relative Total Fixed Capital in Manufacturing in Terms of 1880 Prices
Index Numbers 1899 = 100

Year	Index Number	Year	Index Number
1899	100	1911	216
1900	107	1912	226
1901	114	1913	236
1902	122	1914	244
1903	131	1915	266
1904	138	1916	298
1905	149	1917	335
1906	163	1918	366
1907	176	1919	387
1908	185	1920	407
1909	198	1921	417
1910	208	1922	431

Source—Douglas & Cobb, "A Theory of Production," Supplement to American Economic Review, p. 145.

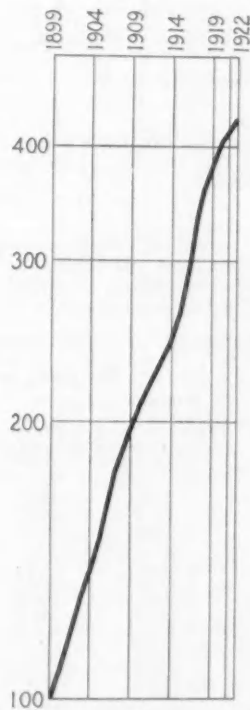


Chart 26—Growth of Total Relative Fixed Capital in Manufacturing. (In terms of 1880 prices. Index numbers, 1899 = 100)

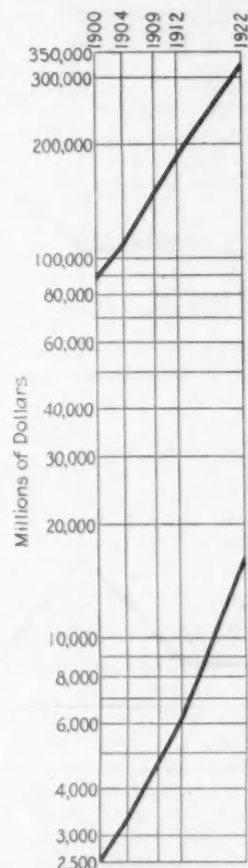


Chart 25—Growth of Wealth in the U. S. Upper curve represents total wealth, lower curve the portion represented by manufacturing equipment and tools

ment at any particular time will be influenced by consideration of the prevailing levels of business activity, of commodity prices and labor prices and the relative difficulty or ease of obtaining capital funds for the purpose.

It seems probable, therefore, that power capacity is a more reliable basis for evaluating the relative changes in capital invested in manufacturing equipment than would be the dollar valuations.

Power Capacity as a Measure of Investment

Here, however, the capital represented by manufacturing equipment is more accurately depicted by the aggregate total capacity of prime movers plus total connected capacity of motors installed than by the adjusted figure which gives effect to the excess of motor capacity over generator capacity. The tendency with the more flexible electrical transmission has been to provide more machines and to locate them more conveniently to the handling of material. Thus each motor may be taken to represent a machine of corresponding productive capacity.

Chart 24 has been prepared on the unadjusted horsepower figures as a measure of capital investment. Here,

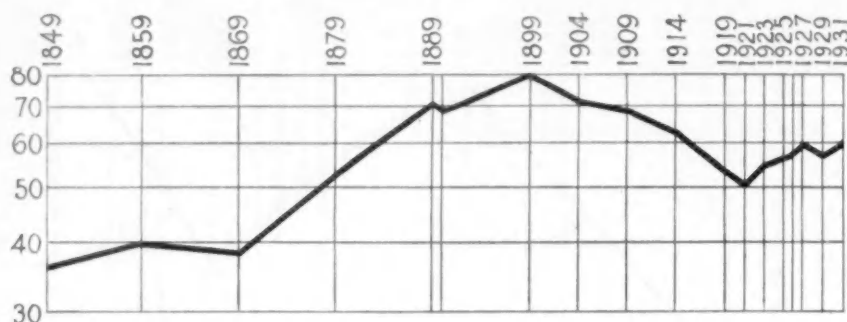


Chart 27

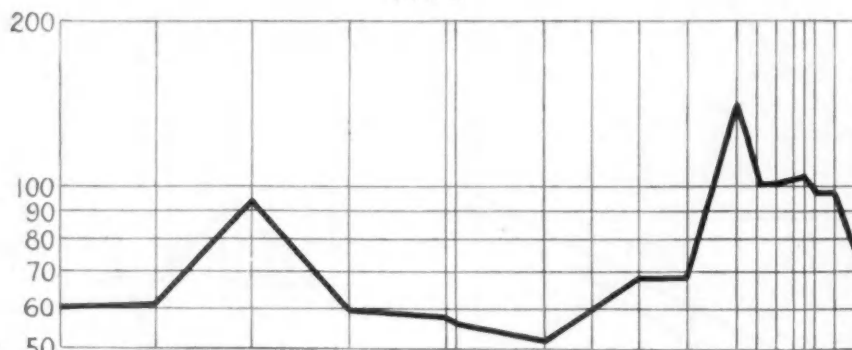


Chart 27a

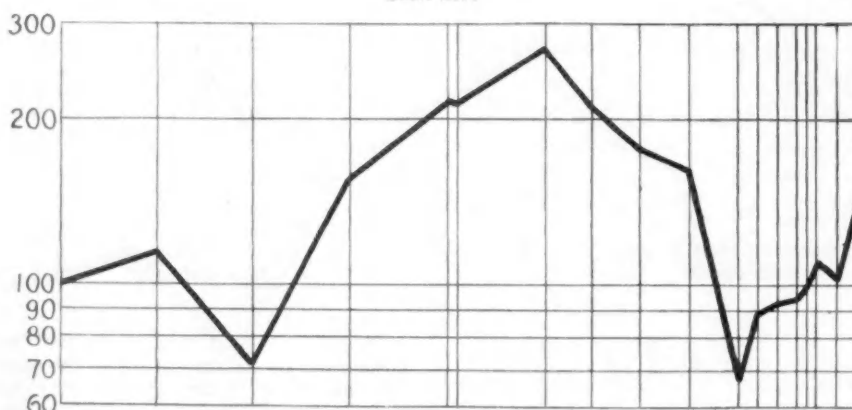


Chart 27b

Chart 27, 27a and 27b—Money Bond Income (27) Compared with Wholesale Commodity Price Index (27a) and Real Bond Income (27b). (Price Index, 1926 = 100. Real Bond Income Calculated from Commodity Prices)

again, as in the consideration with respect to mechanization, we find that the period of most rapid growth was not during our recent "new era" decade, but was during the 1890's. As we might expect with the provision of more elaborate and more expensive machines, the capital investment per wage-earner advances at a rate more rapidly than power per wage-earner but suggests a closer approach to a maximum; that is, the curvature of the trend line is sharper.

Certain considerations with respect to the basis on which capital investment is to be appraised have already been suggested. The volume on Manufactures in Part I of the Bureau of the Census for 1905, at page lxiv, has this to say with respect to the defects in the statistics on capital investment:

1. "It is impossible to define the word 'capital' for statistical measurement so that the thing measured shall be tangible, restricted and uniform."

2. "The value of 'fixed capital'—land, buildings, and machinery—is dependent upon conditions of which a census can take no cognizance."

3. "The difficulties attending the collection of statistics for live capital—cash on hand, bills receivable, unsettled accounts, etc.—preclude the possibility of reliable results."
4. "It is impossible to eliminate the duplications in gross assets and credit capital."
5. Good will, patents, mining rights, etc., are forms of capital for which no satisfactory value can be obtained."
6. "Many manufacturing companies have investments other than those required to carry on the manufacturing operations, such as railroads and steamships, timber lands, and it is impossible to segregate the capital that pertains strictly to manufacturing."
7. "Many corporations contend that they have but one capital account and it relates to the value of the capital stock and bonds and therefore it is impossible to make a report of the actual or commercial value of their property as distinct from its earning capacity and other features which are considered in fixing the capitalization."

With these thoughts in mind we may consider collateral evidence with respect to the growth of capital investment computed on a dollar basis. The "Statistical Abstract" for 1932 at page 271, under the general heading of "Wealth," presents an estimate of the national wealth of the United States by classes of property 1900 to 1922. The grand total of all forms of wealth and the portion of the national wealth in the form of "manufacturing machinery, tools, etc.," there given are plotted on Chart 25. Inasmuch as the purchasing power of the dollar as represented by the reciprocal of the wholesale commodity price index was as 1.000 in 1900 to 0.580 in 1922 and passed through an intervening low point of 0.364 in 1920, it is obvious that it required the investment of more dollars in the latter part of this period than it did in the earlier part to buy an equivalent physical quantity of manufacturing equipment or of any other commodity. The indicated rate of value growth is therefore much steeper than the rate of growth of physical quantity of equipment provided by the capital investment. Relatively the chart shows the growth in the wealth represented

Real Bond Income—Index Numbers—1926 = 100

Year	Average Bond Price Computed by Capitalizing Yield on 5% Basis	Corresponding Yield @ 5%	Wholesale Commodity Price Index	Real Income Computed on Price Index	Cost of Living Index	Real Income Computed on Cost of Living Index
1849	72.2	36.10	60.1	104.6		
1859	80.4	40.20	61.0	114.9		
1869	76.6	38.30	93.5	71.5		
1879	105.0	52.50	58.8	155.5		
1889	141.1	70.55	57.4	214.2		
1890	136.4	68.20	56.2	211.5	43.3	86.8
1899	159.8	79.90	52.2	267.0	42.5	103.5
1904	142.3	71.15	59.7	208.0	47.9	82.0
1909	136.7	68.35	67.6	176.2	50.4	74.8
1914	125.0	62.50	68.1	160.0	58.8	58.6
1919	106.5	53.25	138.6	67.0	107.5	86.4
1921	100.5	50.25	97.6	89.8	101.2	86.7
1923	109.3	54.65	100.6	92.9	97.6	97.7
1925	112.3	56.15	103.5	94.5	100.3	97.7
1926	115.7	57.35	100.0	100.0	100.0	100.0
1927	120.0	60.00	95.4	109.6	98.6	106.3
1929	113.2	56.60	96.5	102.1	97.5	101.3
1931	118.4	59.20	73.0	141.4	84.6	122.0

Source—"Business Activity and Four Price Series," a chart prepared under the direction of Leonard P. Ayres and published by Cleveland Trust Co.

by manufacturing machinery, tools, etc., to have been more rapid than that of the total wealth.

Douglas & Cobb, "A Theory of Production," presented in the supplement to the American Economic Review for 1928, at page 145, shows "Estimated Annual Additions to Fixed Capital in Manufacturing together with cumulative total capital as expressed in terms of cost and 1880 prices." Only the column showing "Relative Total Capital—1899 = 100" is here reproduced and shown in Chart 26. For convenience of comparison with the reference to Chart 25 the purchasing power of the dollar in 1880 (derived from the wholesale commodity price index) was as 0.802 to 1.000 in 1899; 0.338 in 1920 and 0.540 in 1922. Thus it would have required more 1880 dollars of a relative purchasing power of 0.802 than of 1899 dollars of a purchasing power of 1.000 to buy an equivalent physical quantity of equipment and not so many 1880 dollars of 0.802 relative purchasing power as 1922 dollars of 0.540 relative purchasing power to buy an equivalent physical quantity of equipment.

Consumption of fuels reduced to a coal equivalent has also been used as a measure of the growth and extent of mechanization.

An index so derived, however, is so distorted by the uses of fuels for other than manufacturing power as to be of no value in the present study. The use of fuel for transportation purposes and more especially the very rapid increase in the use of petroleum products as automobile fuel is one of the largest of these disturbing elements. Other important uses of fuel not for manufacturing power are heating and lighting of which commercial lighting and street lighting are large elements.

The Incentive to Invest Capital

Owners of capital will seek investments most eagerly where promise of return is most favorable. This general principle will hold, regardless of the opinion of the individual, with respect to an equitable distribution of the earnings of industry as between capital and labor; that is, between interest, dividend payments and wage payments.

Nor is the benefit from the earnings on capital investment confined to comparatively rich people. The institution in which the wage-earner deposits his savings and the company that insures his life must invest their funds and depend for their continued existence on the earnings of such invested capital.

Earnings on invested capital like earnings of wage-earners have their relative real value as well as their money value. Earnings on invested capital, however, are in general governed by long term commitments, whereas wages are governed by short term agreements. The very term "fixed" capital as applied to manu-

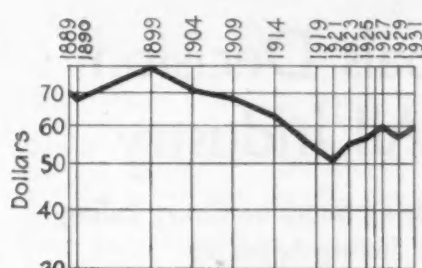


Chart 28

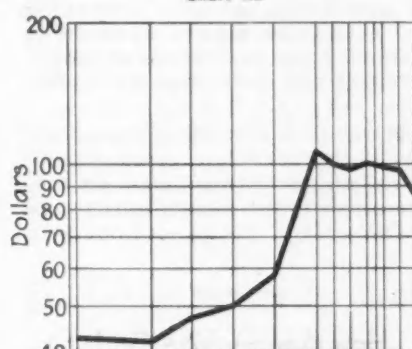


Chart 28A

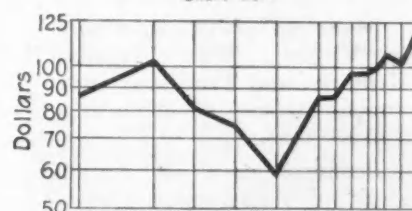


Chart 28B

Chart 28, 28a and 28b—Money Bond Income, in Dollars (28) Compared with Cost of Living (28a) and with Real Bond Income Based on Cost of Living (28b). (Index, 1926 = 100)

facturing plants implies a permanency of investment. Money put into machinery today must remain until retired out of earnings regardless of foreseeable or unforeseeable changes in conditions. Labor, on the other hand, is free to seek employment in other enterprises or industries as conditions may change.

Thus the money earnings on invested capital do not follow the fluctuations in the price level with the same flexibility as money wages.

The denominator of real earnings on invested capital is not so easily fixed as the denominator of real wages. There is a much wider range in the economic and social status of those who receive some part or all of their income from the earnings of invested capital than there is in the status of wage-earners. It is, therefore, not possible to construct a typical budget which will be representative of the average living standard of all families that receive part or all of their income directly or indirectly from investment.

The Available Data on Income From Invested Capital

A computation of the real wage of invested capital paralleling the computation of the real wage of wage-earners may, nevertheless, throw

some light on comparative rates and direction of change if not on absolute values.

Data on the money amount of such income is not so readily available as data on money wages. Colonel Ayres' chart of bond prices is based on "the yields of high grade bonds capitalized at 5 per cent. For the years 1857 to date the yields are those of high grade American railroad bonds as compiled by Dr. Fred R. Macaulay, of the National Bureau of Economic Research of New York. The yields used from 1831 through 1856 are current yields of state and municipal issues. The index is composed of eleven bonds from 1841 through 1856. This index was adjusted to connect with the railroad index in 1857." From this series a series representing money income on bond investments has been computed on a 5 per cent basis.

The Computation of Real Income on the Basis of the Wholesale Commodity Price Index

In Chart 27 this series has been used with the wholesale commodity price index series to compute real bond income and in Chart 28 the same series has been used with the cost of living index to compute real bond income on that basis.

It may be that if a properly weighted average of expenditures of bond income could be obtained it would indicate that such expenditures are conditioned more nearly by the same influences that affect wholesale prices than the influences that affect the cost of living index. If this be true, the index of relative real bond income computed on the wholesale commodity price index will more nearly represent the character of the changes in such real income than will a computation based on cost of living index.

In any event Chart 27 indicates quite clearly how the high prices that come with wars depress real bond income because of the long term character of the conditions on which they rest, whereas wages at such periods being more flexible tend to rise with the cost of living.

On the other hand, and by reason of the same long time characteristics, real bond income rises disproportionately in periods of declining commodity prices. Thus, the most conspicuous feature of the real bond income curve on Chart 27 is the hump, reaching a peak in 1899. It was during the rapid rise of real bond income culminating in that peak that the term "bloated bond holder" had peculiar significance.

The Computation of Real Income on the Basis of the Cost of Living

The real bond income computed on cost of living as shown in Chart 28 exhibits similar characteristics with a corresponding peak in 1899. It may be that if we had the intermediate

(Concluded on Advertising Page 16)

Appalachian Coals Decision Applicable to All Industry

Steel Companies and Others Studying Supreme Court Ruling Which Permits Common Selling Agencies

WASHINGTON, March 21.—Approval by the United States Supreme Court of the Appalachian Coals, Inc., has been accepted with enthusiasm by many industrialists. They look upon it as giving unusually free translation of the Sherman anti-trust law. Some think it marks unprecedented legal charting of the rights of industry to organize, without restraining or monopolizing interstate commerce, to the advantage of both itself and its consumers. The decision, however, handed down through Chief Justice Charles E. Hughes, was supported in many of its points by previous findings of the Supreme Court, including those in the United States Steel Corp'n. case. The fact remains that it has breadth.

The decision said that the general phrases of the Sherman law, interpreted to attain its fundamental objects, set up the essential standard of reasonableness.

"They call for vigilance in the detection and frustration of all efforts unduly to restrain the free course of interstate commerce," the opinion declared, "but they do not seek to establish a mere delusive liberty either by making impossible the normal and fair expansion of that commerce or the adoption of reasonable measures to protect it from injurious and destructive practices and to promote competition upon a sound basis."

Question Is Whether There Is Attempt to Monopolize

It was pointed out that the anti-trust act aims at substance. Nothing in theory or experience, the Supreme Court said, indicates that the selection of a common selling agency to represent a number of producers should be deemed to be more abnormal than the formation of a huge corporation bringing various independent units into one ownership. Either, it was stated, may be prompted by business exigencies and the statute gives neither a special privilege. The court pointed out that the question in either case is whether there is an unreasonable restraint of trade or an attempt to monopolize.

Emphasis was given to the distressing condition in the coal industry and the Supreme Court gave much weight to the insistence of the coal operators making up the Appalachian Coals, Inc., their common selling agency, that it was organized to increase the sale, and thus the production of Appalachian coal through better methods

of distribution, intensive advertising and research, to achieve economies in marketing, and to eliminate abnormal, deceptive and destructive trade practices.

The decision said that the mere fact that the parties to an agreement seek to eliminate competition between themselves is not enough to condemn it. No attempt will be made to limit

How Appalachian Coals, Inc., Will Operate

Made up of 137 operators in Virginia, West Virginia, Kentucky and Tennessee, with annual capacity of about 87,000,000 tons.

Producers own all capital stock of Appalachian Coals, Inc., holdings being in proportion to their production.

Majority of common stock, which has exclusive voting right, held by 17 producers.

By uniform contracts, separately made, each producer constitutes the company (Appalachian Coals, Inc.), an exclusive selling agency for sale of all coal mined.

Company agrees to establish standard classification, to sell all coal of its principals at best prices obtainable and, if all cannot be sold, to apportion orders upon a stated basis.

Prices to be fixed by officers at central office, save that, upon contracts calling for future deliveries after 60 days, company must obtain producer's consent.

Company to be paid 10 per cent of gross selling prices f.o.b. mines, and guarantees accounts.

In order to preserve their existing sales' outlets, producers may designate sub-agents, according to agreed form of contract, who are to sell upon terms and prices established by the company and are to be allowed by the company commissions of 8 per cent.

production. Consumers said the plan will be a benefit to the coal industry and will not restrain competition.

Interests of Producers and Consumers Are Interlinked

"The interests of producers and consumers are interlinked," the Supreme Court said. "When industry is grievously hurt, when producing concerns fail, when unemployment mounts and communities dependent upon profitable production are prostrated, the wells of commerce go dry."

Appalachian Coals, Inc., will control about 73 per cent of the developed mining capacity in its district. The Supreme Court said that operators making up the organization will continue to be subject to active competition.

"In addition to the coal actually produced and seeking markets in competition with defendants' coal, enormous additional quantities will be within reach and can readily be turned into the channels of trade if an advance of price invites that course," the decision declared. . . "The plan cannot be said either to contemplate or to involve the fixing of market prices."

Decision Applicable to All Industries

While the legislative trend is toward more freedom for the raw resource and agricultural industries under the trust laws than for manufacturing lines, the Appalachian decision of course is applicable to all industries. That common selling agencies will be set up in other industries besides coal has already been determined upon, though supervision continued by the court in the Appalachian case may be a retardant in this direction. Probable demand for increased Government supervision by legislation also may hold back the development of common selling agencies.

Steel has many of the ailments common to coal and other industries and already there is said to be discussion of plans for setting up common selling agencies in certain of its units. One thought in mind is to avoid large overhead and operating expenses of such organizations which have proved the undoing of efforts to promote trade in the past. The old pools also would be avoided. For the Appalachian Coals decision apparently makes it plain the Supreme Court would today stand ready to attack such pools as it did in the United States Steel Corp'n. case. The Appalachian decision, it will be seen, permits the formation of common selling agencies which cover only a part of mining capacity. It distinctly does not give freedom to organization of complete units in coal or any other line. It makes it clear that competition to the point of unduly restraining trade would not be condoned.

Orders for electric industrial trucks and tractors totaled 15 units in February compared with 39 in January, according to the Bureau of the Census.

Automatic Indexing Milling Machine

FOR use where a number of slots for surfaces are to be milled on the periphery or face of a part, the Producto Machine Co., Bridgeport, Conn., is offering a new automatic indexing milling machine, designated as the No. 35. As in previous Producto-Matic millers, operation is controlled by cams and is fully automatic; in this machine the only manual operation is placing the work on arbors or in the work-locating collet. The cutters feed both horizontally and vertically; first they feed to depth, then travel forward to finish the cut, and finally rise out of the cut and return clear of the work while indexing takes place.

The machine is equipped with a multiple-index head having two, three, or four spindles. In all cases the maximum diameter of work is 4 in. The horizontal stroke of the cutters is 5 in. and the vertical stroke 2 in., both controlled by cams on a single camshaft. These cams may be removed and replaced easily when the work is changed, as they are simply keyed and held by hardened screws on the shaft. The tailstock is equipped with a quick-acting center, and is adjustable along the bed of the machine. When necessary, work locators can be mounted between the head and tailstock to locate the work from any given point.

A feed and speed mechanism that employs vee-pulleys and belts, instead of gears, and that gives a wide choice of feed and speed changes is a new feature. The drive is by a 3-hp. 1750-r.p.m. motor, which drives the camshaft through a three-step vee-groove pulley and belt. This motor, with all other units, is mounted within the cabinet base of the machine. The entire transmission is contained in a welded-steel case, bolted to the end of the cabinet base. Throughout the transmission, three-step pulleys and cog belts are used, the latter to as-

sure positive drive. Including the pulley on the motor shaft, there are nine pulleys in the transmission, giving nine changes of feed and of cutter speed. Cutter spindle speeds range from 42 to 500 r.p.m., with the same pulley combination, camshaft speeds, which control the feed of the cutters, range from 9 to 65 sec. per revolution of the camshaft. Thus a wide variety of feeds and speeds are available for various conditions of milling conditions and for securing roughing and fine finishing cuts. These changes are obtained merely by shifting the V-belts from one step to another. A conveniently-operated belt tensioning device is provided.

Electric Hammer for Both Chipping and Drilling

THE double-purpose Thor electric hammer recently announced by the Independent Pneumatic Tool Co., 600



West Jackson Boulevard, Chicago, will drill, chip, and channel concrete, brick, wood and other materials, and also chip steel and drive light rivets. Applications include installing machinery foundations and plumbing and electrical work.

In hard limestone, the tool is said to drill a 1/4-in. hole, 1 1/4-in. deep, in 1 min., using the standard taper shank drill with holder. If the drill is made solid with a straight shank which fits directly into the hammer

without an adapter, the time is said to be reduced by as much as one-half.

Specifications include: Blows per min., 3000; length overall, 18 in.; and weight complete, 16 lb. A 1/4-in. Jacobs chuck, 9/16-in. star drill, tool holder and ejecting pin, and a carrying case are standard equipment.

Automatic Permutit Water Softener

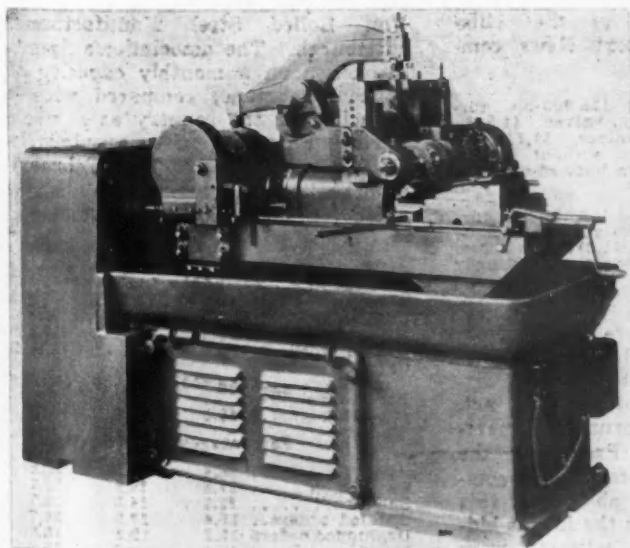
A NEW fully automatic industrial zeolite water softener has been announced by the Permutit Co., 440 Fourth Ave., New York. It is designed to eliminate the errors due to the human element and conduct all of the operations of softening and regeneration with machine-like regularity and precision.

By a combination of a meter-operated switch and electric controls with a motor-driven Permutit single valve, each operation of the water softener is conducted under precise control for highest efficiency results. Briefly, at the end of the softening run, the meter actuates the electrical controls which carry through the steps of:

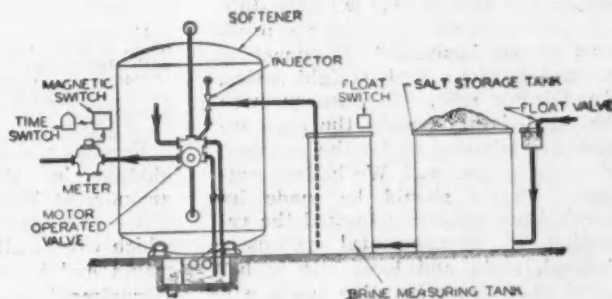
Cutting the softener out of operation. Backwashing it for a regulated period to secure thorough cleansing. Admitting a carefully regulated amount of saturated salt brine to assure thorough regeneration without wastage of salt. Rinsing out the hardness salts to waste with the minimum amount of rinse water. Throwing the softener back into service, thus placing it again under control of the meter, which governs the volume of water to be softened during the softening run and initiates the start of the next regenerating cycle.

The automatic control may be applied to existent downflow softeners to convert them to fully automatic operation.

Tentative plans for the American Foundrymen's Association convention at the Stevens Hotel, Chicago, June 20 to 23, in addition to providing for many regular convention features, include a four-act play, dramatizing a foundry's experience in determining and setting up a workable, efficient cost system.



THE indexing type miller shown at left is for parts requiring the milling of a number of slots or surfaces around the periphery or face.



The meter-operated switch, electric controls and motor-driven valve of this fully-automatic industrial water softener give precise control of each operation.

Work Started on New Detroit Steel Plant

Construction of the first unit of a new steel plant in Detroit to make billets and bars by a centrifugal casting process has been begun by the Rotary Electric Steel Corp. The first published reference to this new company appeared in *THE IRON AGE* of Feb. 23, page 324. The new plant was designed by H. M. Naugle and A. J. Townsend, Canton, Ohio, who formerly were, respectively, president and vice-president and general manager of the Columbia Steel Co. of Elyria, Ohio, and Butler, Pa., which developed a process for the continuous rolling of steel sheets, which was sold, together with the plant, in 1927 to the American Rolling Mill Co., Middletown, Ohio. Others associated with them in the Detroit venture are: W. H. Colvin, Sr., W. H. Colvin, Jr., and W. H. Eckert, of Chicago.

Buildings to be constructed at Detroit include a main mill building, 72 by 1200 ft., of structural steel on concrete foundation and a two-story office building, 45 ft. sq., of brick and reinforced concrete. The general contract has been awarded to the Walbridge Aldinger Co., Detroit. Contracts for rotary furnaces, casting machines and special electrical equipment have been awarded to the Westinghouse Electric & Mfg. Co., East Pittsburgh. A temporary office has been established by the steel company at 20781 Pinewood Avenue, Detroit.

T. M. Girdler Hopeful for Increased Steel Output

In its printed report for 1932, supplementing its preliminary report made recently, the Republic Steel Corp. through its chairman T. M. Girdler, expresses the belief that even ordinary replacements soon will demand an increased output of steel.

"Under the generally adverse conditions your corporation has obtained its share of going business," continued Mr. Girdler, "and has made extraordinary efforts in the direction of cost reduction, including considerable further decrease in salary rolls. In spite of the general retrenchment necessary, an efficient organization has been maintained able to cope with the difficult and continually changing problems of our business." Commenting on tax burdens and freight rates, Mr. Girdler said, "In common with the rest of the country the steel industry is laboring under the pressure of a heavy tax load. We believe continued efforts should be made by stockholders generally toward the reduction of governmental expenses, Federal, state and local. It is believed that transportation costs are still excessive, being particularly burdensome to the steel industry on account of the large tonnages of mate-

rial involved in iron and steel manufacture."

The report states that charges for depreciation and depletion were continued at the regular normal rate during the year, but expenditures for improvements were extremely low. Cash balance at the end of the year was \$8,439,521 as compared with \$8,699,745 at the beginning of the year. The funded debt was reduced last year \$3,105,400, notes payable reduced \$1,438,000 and accounts payable, accrued interest, taxes, etc., were reduced \$2,036,400. Inventories were reduced \$8,547,667 and accounts receivable \$2,919,953.

Production last year was: ore, 149,589 gross tons; coal, 980,016 net tons; coke, 939,306 net tons; pig iron, 519,380 gross tons, and ingots, 903,899 gross tons. Shipments were: finished steel, 835,187 net tons; semi-finished steel, 46,659 net tons, and pig iron, 141,216 gross tons. Shipments in 1931 were: finished steel, 1,531,684 net tons; semi-finished steel, 78,910 net tons, and pig iron, 277,827 gross tons.

Bids Taken on Turbines For Hoover Dam

WASHINGTON, March 21.—Apparently the Allis-Chalmers Mfg. Co., Milwaukee, and the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., are the lowest bidders on five 115,000-hp. turbines for the Hoover dam power plant. The Newport News company appears to be the lowest bidder on two 55,000-hp. turbines. The Woodward Governor Co., Rockford, Ill., was low with a combination bid of \$79,526 for governors for the five large and the two smaller turbines.

The bids were opened recently in Denver, Colo., by the Bureau of Reclamation, Department of the Interior. The matter of weights, lifting charges from vessels, in case of shipments by water, and other items will have to be considered before the lowest bidders are determined.

The turbine bids of the Allis-Chalmers and Newport News companies follow:

Allis-Chalmers: Five 115,000-hp. turbines, without butterfly valves, \$1,369,900; with butterfly valves, \$1,719,300. Two 55,000-hp. turbines, without butterfly valves, \$289,900; with butterfly valves, \$365,000.

Newport News: Five 115,000-hp. turbines without butterfly valves, \$1,403,000; with butterfly valves, \$1,816,144. Two 55,000-hp. turbines, without butterfly valves, \$249,368; with butterfly valves, \$338,020.

Foreign makers were barred from bidding by the "Buy American" amendment incorporated in the Post-Office Treasury appropriation act, which covers all Government departments and bureaus. Previously, the Department of the Interior was compelled, because of the absence of this provision, to buy from the lowest bidder. Foreign manufacturers were

prepared to submit much lower bids than domestic makers could possibly offer for the turbine contracts. There is about \$14,000,000 worth of machinery yet to be purchased for the Hoover dam power plant, all of which will be American-made. The "Buy American amendment" now is written in all specifications of the Department of the Interior as well as in those of other Government departments.

Wrought Pipe Standard Distributed for Criticism

Copies of the proposed American standard for wrought iron and wrought steel pipe have been submitted to 300 manufacturers and consumers for criticism and comment.

This proposed standard has been developed, it is stated, to unify the lists of pipe thicknesses and weights developed in the United States over the last 50 years. Important developments in the manufacture of such pipe have taken place and parallel with these developments, the service demands have become increasingly severe. Because of the changes in manufacture, materials and application, the thicknesses given in the original standards for low pressures, published in 1886, have been varied as occasion demanded. It has become increasingly evident, state the sponsors of the project, that steps should be taken to undertake a unification of and, where possible, a reduction in number of different pipe thicknesses produced.

Copies of the proposed standard may be obtained from C. B. LePage, assistant secretary, American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

Sheet Sales and Output Gained in February

Sales and production of sheet mill products during February registered a sizable increase over the preceding month, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers, Pittsburgh. The association's figures are based on a monthly capacity of 330,000 net tons; compared with a capacity for the country as a whole during February of approximately 550,000 net tons. The February report with comparisons with the two preceding months in net tons follows:

	Feb.	Jan.	Dec.
Sales	80,550	75,615	76,962
Production	91,723	85,337	77,489
Shipments	72,772	79,234	67,412
Unfilled orders	83,760	77,509	84,390
Unshipped orders	43,392	39,952	37,245
Unsold stocks ..	57,296	54,831	57,413
Capacity per month	550,000	550,000	550,000
Percentage reporting	60.0	60.0	62.2
Percentages Based on Capacity			
Sales	24.4	22.9	22.5
Production	27.8	25.9	22.7
Shipments	22.1	24.0	19.7
Unfilled orders ..	25.4	23.5	24.7
Unshipped orders ..	13.2	12.1	10.9
Unsold stocks ..	17.3	16.6	16.8

Is Inflation in the Offing?

By G. L. LACHER



G. L. Lacher

IS the United States headed for inflation? This question would be easier to answer if American business were conducted entirely on a currency basis. But this is not the case. In normal times 90 per cent of our trade is carried on with bank deposit currency, i.e. checks. This form of money

has undergone drastic deflation during the depression. Since 1929 bank deposits have declined from 555 billion dollars to 40 billions, a shrinkage of 27 per cent. In the same period there has been a sharp falling off in the velocity of the turnover of bank credit.

This deflationary movement reached a climax in the recent bank panic, when there was a nation-wide effort to convert deposits into currency. An impasse was inevitable. Banking is essentially a process of economizing currency—of making a given amount of money support several times its value in credit. Naturally there wasn't enough currency to satisfy demands. However, the banking holiday was declared only after the Federal Reserve System had attempted to put out enough new Reserve notes to equal the withdrawals of depositors. In the brief period of three weeks money in circulation showed an increase of \$1,684,000,000, bringing the total volume outstanding up to \$7,500,000,000.

A much smaller amount was in circulation in 1929 — \$4,750,000,000. Hence, in terms of outstanding currency, inflation is already an accomplished fact. The catch comes in the fact that a large part of our money is not in use. It has been hoarded. If all idle currency should suddenly find its way back into actual circulation and if deposit currency should again be used in most business transactions, then we should have inflation with a vengeance.

But a return of money from hoarding depends on confidence, and confidence is an elusive thing. If liquidation continues and the future of busi-

nesses and banks remains under a cloud, money is likely to stay in hiding. It was precisely for the purpose of overcoming the misgivings of the timid, that the Government, through emergency legislation, recently took two important steps. First, it prevented the reopening of the weaker banks, giving force to the presumption that those which were permitted to resume operations are "sound." Secondly, it provided authority for the emission of emergency currency to protect banks from a recurrence of disastrous runs. This currency is in the form of Federal Reserve Bank notes, which may be issued against any Government bonds up to their full face value, or against "notes, drafts, bills of exchange, or bankers' acceptances" up to 90 per cent of their estimated value.

Thus far those measures have produced encouraging results. Considerable hoarded money has returned to the banks. The amount of currency outstanding actually declined \$269,000,000 in the week ended March 15. Only \$9,472,801 of the new type of currency has gotten into circulation (up to March 16). Its use will be resorted to only under absolute necessity, because banks obtaining it must pay an annual tax of 2 per cent.

Inflation—a sharp increase in commodity prices—may come if there is a heavy return of money to the banks. However, such a return will be impeded so long as many communities are entirely without banking facilities and must use currency instead of checks to carry on business. In this connection, it must not be overlooked that one result of the Government's emergency action has been an increase in the number of closed banks. Of the 17,601 banks in operation when the banking holiday was declared, 4060 have not been permitted to open. Depositors in the closed banks have been deprived of the use of their funds. Conservators of those banks may, in many cases, liquidate the assets, thereby adding impetus to existing deflationary forces and neutralizing, in part at least, any inflationary influences that may grow out of increased confidence in reopened banks.

Confidence, in the long run, depends on the trend of commodity prices. If prices continue to recede, the individual will continue to prefer money to goods. Deflation, after all, means a general disposition to convert commodities or property into money. Inflation, on the other hand, reflects a mass effort to convert money into goods. Inflation of a violent sort could be produced if the Government issued such large quantities of irredeemable currency as to destroy the public's faith in its value. But no such inflation appears to be around the corner. In the meantime world pressure against our commodity prices is unrelieved. The embargo on gold exports and the restrictions imposed on foreign exchange transactions have failed to fulfill expectations of a depreciation of the dollar in international marts. If the dollar holds its own, the deflationary influence of imports from depreciated currency countries will continue to be felt.

Features of Meeting of Electrochemists

Among the papers scheduled for the meeting of the Electrochemical Society, to be held at the Windsor Hotel, Montreal, May 11, 12 and 13, are the following: Chromium plating on zinc, by M. deKay Thompson and F. C. Jelen; organic agents for cadmium electroplating, by R. A. Clausen and H. L. Olin; platinum, tantalum and columbium as cathodes for metallic depositions, by D. F. Calhane and C. Malcolm Alber; cyanide-free bath for the deposition of copper on steel, by Colin G. Fink and C. Y. Wong; electroplating of rhodium, by Prof. Fink and George C. Lambros, and nickel plating of fabricated zinc in a barrel, by Albert Hirsch. A session on the electric furnace is announced for the morning of May 12.

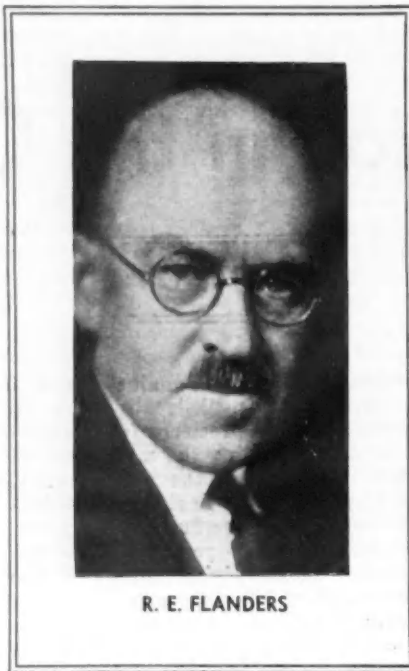
In conjunction with the meeting there will be an exhibition of electrochemical products and processes. Convention excursions include plant trip to the Canadian Copper Refiners, Ltd., and the Montreal brewery and on May 13 to Shawinigan Falls. R. A. Witherspoon, Shawinigan Chemicals, Ltd., Montreal, is president, and Prof. Colin G. Fink, Columbia University, New York, is secretary.

... PERSONALS ...

RALPH E. FLANDERS has been elected president of the Jones & Lamson Machine Co., Springfield, Vt., to succeed JAMES HARTNESS, who recently retired. K. H. WOOLSON takes the office of vice-president. Mr. Flanders joined the company in 1912 as manager of the Fay lathe department. In 1914 he was made general manager, and later vice-president. His early training was obtained as an apprentice at the Brown & Sharpe Mfg. Co., Providence, R. I., where he served from 1897 to 1902. He then went with the Taft-Pierce Mfg. Co., Woonsocket, and a year later joined the International Paper Box Machine Co., Nashua, N. H. From 1906 to 1910 he was associate editor of *Machinery*. Immediately prior to joining the Jones & Lamson company, he was associated with the Fellows Gear Shaper Co. Mr. Flanders is a past-president of the National Machine Tool Builders' Association, and has served as a manager and a vice-president of the American Society of Mechanical Engineers in addition to membership on several committees. Other connections include membership on the National Screw Thread Commission and the American Engineering Council. Mr. Flanders is author of books on "Gear Cutting Machinery" and on "Taming Our Machines," as well as of several papers and articles on technical and engineering subjects. Mr. Hartness had been associated with the Jones & Lamson company since 1890, first as superintendent, then as manager and finally as president, holding the latter office 32 years. His many inventions include the flat turret lathe, a screw thread comparator and an automatic die. From 1921 to 1923 he was governor of Vermont. He is a past-president of the American Society of Mechanical Engineers and of the American Engineering Council, is a fellow of the American Association for the Advancement of Science and of the Royal Astronomical Society, as well as a member of many societies and scientific organizations.

S. M. BLACKBURN, formerly vice-president and general manager of the John B. Morris Foundry Co. and vice-president of the Morris Machine Tool Co., has been made president and general manager of the J. A. Fay & Egan Co., Cincinnati, succeeding R. W. EGAN, who has retired. CLIFFORD P. EGAN, who has been identified with the wood-working machinery industry for the past 34 years, has become vice-president, succeeding F. T. EGAN, who has retired. ESPY BAILEY, formerly treasurer and auditor of the Fay company, has been elected secretary and treasurer.

GEORGE G. KING has been elected president of the Fosdick Machine Tool Co., Cincinnati, succeeding N. B. CHACE, who has retired from the



R. E. FLANDERS

presidency after 16 years of service to devote his time to other business interests. F. C. TUTTLE is secretary and treasurer and W. R. HOFMANN, manager.

RAY LINN has been appointed sales representative in the Toledo, Ohio, district for the Ex-Cell-O Aircraft & Tool Corp., Detroit. He will represent the Continental Tool Works and Krueger-Wayne Tool Co., divisions of the Ex-Cell-O company, as well as all Ex-Cell-O products, and will make his headquarters at 1432 Jermain Drive, Toledo.

LEROI J. WILLIAMS has been elected vice-president and general manager of the Grigsby-Grunow Co., Chicago, succeeding DON M. COMPTON, who has resigned. M. D. HARRISON has been elected treasurer, also replacing Mr. Compton, who had previously occupied both positions.

GEORGE A. RANNEY, whose resignation as vice-president of the International Harvester Co. was announced in the March 16 issue of *THE IRON AGE*, will continue as a director and member of the Harvester board of directors' finance committee.

A. SCHAEFFER and W. J. HANNA, district sales manager and assistant district sales manager, respectively, for the Republic Steel Corp. at Detroit, gave a luncheon at the Detroit Athletic Club on March 15 to welcome to the Detroit steel trade PHILIP M. GUBA, who recently was appointed assistant district manager of sales at Detroit for the Carnegie Steel Co. Mr.

Guba formerly was assistant district sales manager at New York for the Republic company. Guests attending the luncheon were L. Carlisle, Union Drawn Steel Co.; George G. Gries, Great Lakes Steel Corp.; Frank D. Heath, Jones & Laughlin Steel Corp.; J. S. Hegeman and R. E. Dexter, Bethlehem Steel Corp.; W. Noble, Pittsburgh Crucible Steel Co.; William B. Weston, Carnegie Steel Co.; E. D. Pumphrey, Corrigan McKinney Steel Co.; J. H. Fitch, Inland Steel Co.; R. Atkinson, Timken Steel & Tubes Co.; R. J. Mullally, Youngstown Sheet & Tube Co.; R. L. Shugg, American Rolling Mill Co.; Paul Allen and H. McGregor, Otis Steel Co.; R. Wykoff, Acme Steel Co.; C. Craine, Detroit Steel Corp., and A. A. Keally, Sharon Steel Hoop Co.

E. M. ADAMS, vice-president and general sales manager for Inland Steel Co., has gone to Florida where he will spend a month to six weeks.

... OBITUARY ...

JAMES J. WEILER, president of James J. Weiler & Sons, Huntington, W. Va., structural steel fabricators, died suddenly at his home at that city on March 6, aged 71 years.

H. H. MARTIN, credit manager for the Southern division of the Republic Steel Corp., at Birmingham, died March 12. He had been with the Republic company for the past four years and prior to that had been with the Tennessee Coal, Iron & Railroad Co. for nearly 20 years.

ROLLO G. MANNING, for many years chief engineer of the American Bridge Co., Ambridge, Pa., died at his home in that city on March 10, aged 65 years. He was a graduate of the University of Michigan, and had been engaged in the structural steel business for 38 years. He went to Ambridge in 1906 as chief engineer for the American Company, and held that position until 1928, when he resigned to become vice-president of the Ambridge Saving & Trust Co.

MARSHALL LAPHAM, president of the Spiral-Rolled Products Co., New York, died at his home at Tompkinsville, Staten Island, N. Y., on March 18, aged 65 years.

JOHN MCMYLER, founder of the McMyler Mfg. Co., Bedford, Ohio, which later became the McMyler Interstate Co., died at his winter home in St. Petersburg, Fla., March 20. Mr. McMyler was a pioneer in the development of modern unloading machinery and among his activities was the development of a car dumper.

OFF THE ASSEMBLY LINE



Motor Car Makers Resume Operations; Sales Upturn Expected in April

DETROIT, March 20.

FOLLOWING a relatively stagnant period of two weeks during which activities fell almost to the zero mark, the automobile industry is slowly resuming operations. Chrysler was the first of the major companies to swing into production, its Plymouth division having started assemblies on Wednesday and the Dodge plant on Thursday. It is understood that these two divisions have orders on hand from dealers for about 9000 cars. Chrysler likewise is beginning work on 500 of its Imperial line.

All General Motors plants are scheduled to open today. Chevrolet's local divisions are taking up their activities again after being idle since last Monday night.

Both the gear and axle and forge divisions expect to operate only two days this week but the Flint and Saginaw plants will run three days. Although Chevrolet has given some small releases for steel and parts, the tonnage thus far has not been of appreciable volume.

Ford is reported to be planning on expanding its manufacture at the Rouge plant this week after having confined its program the past week to balancing stocks of certain items. Packard resumed assemblies the middle of last week, while Graham-Paige will start its body and car assembly plants tomorrow. Hudson is going ahead on a modest scale.

This somewhat precipitous return to a more normal production basis should not be interpreted in too optimistic a light. Motor car output naturally is dependent on retail sales and on the ability of dealers to finance their transactions. Normal banking facilities are far from being restored throughout the country. That is, in most cities restrictions are being enforced which permit only limited withdrawals. For at least several weeks this will act as a brake on the closing of retail orders. In fact, the Atlantic seaboard, particularly New York and the New England States, is the only part of the country in which sales

have been sufficient to arouse any enthusiasm on the part of the sales executives of automobile companies. Automobile manufacturers have their eyes pinned on the commodity markets just now, believing that a rise in the price of such products as cotton, wheat, corn and hogs will do more than anything else to start people buying cars in the South and the Middle West, which usually are among the industry's most fertile sales territories.

Heavier Buying Expected in April

Ordinarily the spring selling season starts early in March, but the banking crisis intervened this year, with the result that the industry looks for little volume buying until about April 15. Sales executives are anticipating a seasonal bulge in retail orders from that date until the end of June. Because the seasonal upswing will get a later start than usual, the June decline from May should be slight. Moreover, the industry is unanimously of the opinion that each month in the last half of the year will surpass the corresponding month of 1932. This is attributed not only to an anticipated gradual improvement in all business, but also to the fact that last year sales beginning July 1 were artificially restricted by the application of the Federal excise tax. There was a rush of buying just prior to June 20, when the tax became effective, with July orders showing an abnormally large decline. The excise tax likewise affected sales in later months of 1932.

The continued lack of banking facilities in Detroit is proving a terrific handicap to large as well as small companies. All of the major automobile builders have been importing cash to meet payrolls ever since the banking holiday began on Feb. 13. This has been an inconvenience and a drain on their resources, millions of dollars of which are tied up in local banks. In addition there are many small automotive parts makers throughout the State which have been doing their banking in Detroit. These firms have most of their working capital in the closed banks and meanwhile are unable to run their plants.

Many of these plants, as well as a considerable number of small metal-working establishments, will virtually be put out of business in the liquidation of the First National Bank Detroit and the Guardian National Bank of Commerce. For the past week both of these institutions have been in the hands of conservators, who in the liquidation process will offset present loans against deposits, thereby wiping out the working capital of many concerns. After prolonged bickering and petty squabbling among local banking groups, the Federal Government finally insisted last week that Detroit interests agree immediately upon a workable banking plan or have one dictated to them from Washington. The result is that on next Monday a new national bank is to open for business, taking over the liquid assets of the two defunct banks and paying out about 50 per cent of old depositors. The bank will be capitalized at \$25,000,000, half of which has been subscribed by General Motors and Walter P. Chrysler backed by New York bankers and the other half by the Reconstruction Finance Corporation, which will hold non-voting preferred stock. The Detroit's banking holiday promises to terminate at the end of its sixth week. It is reported that Henry and Edsel Ford may start a bank of their own through which the financial business of the Ford Motor Co. and Ford-owned Universal Credit Co. will be conducted.

Ford Putting on More Speed

It is reported that Ford has decided to go ahead immediately with its small V-eight car (model 44) and that in the last few days orders have gone out to machinery builders requesting them to finish as soon as possible equipment which has been held up for the past month and deliver it to the Rouge plant. A week ago indications were that this car was to be postponed indefinitely, at least until fall, but its revival is taken as proof that Mr. Ford believes that a resumption of buying probably will occur in the near future. The unexpected offering of the new standard six Chevrolet is believed

(Concluded on Page 488)

Offers Plan for Rehabilitation of the Railroads

A PLAN for the rehabilitation of the railroads designed to produce additional revenue for the Government and at the same time benefit holders of railroad securities and shippers has been prepared by P. E. Hunter, president, Independent Bridge Co., Pittsburgh.

Mr. Hunter recommends the declaration of a moratorium by Presidential decree during which time no railroad securities could be bought, sold, transferred, taken over on loans or even bargained for, and the enactment of a law permitting the Government to reorganize the capital structures of the railroads in such a way as to permit the establishment of a basis for the exchange of securities, preferably bonds or other indebtedness.

Subsequent procedure might be as follows:

(1) The holders of all railroad bonds would receive 100, 90, 80, 70 or 60 per cent of the present face value of bonds, depending upon their proportionate security. This should be determined by average earnings over the past 10 years, value of property back of the bonds and other factors which ordinarily influence market value.

(2) The Government would guarantee the payment of principal and interest of all bonds issued in the above proportions. This assurance would advance the price of bonds now selling at 15, 20 or 30 to a parity with Government issues, thus producing a more liquid security and banking condition and assisting greatly in restoring the confidence so badly needed at this time.

(3) As a consideration for such a guarantee, the Government would receive in bonds the difference between the face value of present bonds and the guaranteed percentage given to present holders, the railroads continuing to pay interest on the present amount of bonds issued. This income would produce a substantial revenue for the Government.

(4) The interest rate on all bonds would be reduced to approximately $3\frac{1}{2}$ to 3% per cent and the saving between this rate and the rates being paid would reduce substantially further the drain on the Reconstruction Finance Corporation.

(5) The difference between the amount now being paid for interest on present bonds and the amount that would be necessary at the reduced rate would produce a very sizable cushion for the reduction of traffic rates in normal times.

Instructs Users In Making Carboloy Tools

Instructions covering a simplified method of manufacturing Carboloy cemented-carbide tools in the user's plant are contained in a booklet on "How to Make Your Own Carboloy Tools," published by the Carboloy Co., Detroit.

Under this plan the user purchases only the tip or blank and makes the

balance of the tool in his own plant. The plan is advantageous for the smaller manufacturer, job shop, or plant having highly diversified production and small runs on any one type of part. In addition to smaller initial investment in these tools, greater flexibility of use is made possible by the development of a method for removing the cemented-carbide tip without injury to either tip or shank. In this way a single Carboloy tip may be used for several different jobs and the initial cost distributed over a wider range of work.

Instructions cover the machining of the shank as well as the brazing of the tip to the shank. For brazing, an oxy-acetylene torch may be employed. Instructions for correct grinding are not included in the booklet, but can be furnished separately.

What Beer Means to Our Metal Business

(Concluded from Page 463)

cludes as many as 12 fermenting vats of 5560 gallons each, and two small yeast vats of 850 gallons. In addition, there are likely to be a number of the large storage tanks and there are cooling coils and fixtures of rustless steel.

Tests of chrome nickel alloy steel by European brewers have been exhaustive and the results are reported highly satisfactory. Continued use of a small test vessel for fermentation, over a period of six weeks, is said to have resulted in no change in total weight, which was 3100 grams; wort brewed in stainless steel vats was tested for metallic content and indications are understood to have been that the wort was free from contamination. One other claim for its efficiency, made by German industry, is that of being non-magnetic, so that it is unaffected by any possible galvanic currents.

Although somewhat expensive per pound, its high tensile strength, as in other fields of use, permits the use of lighter gage sheets to obtain the same strength in the finished product. While it has so far been largely used in the form of solid sheets and light plates, it is being suggested for application to tanks and vats in the form of clad material, where it has been rolled on ordinary steel plates.

Stainless and Other Metal Kegs

But the brewery itself does not offer the only substantial use of metal in this coming field of American industry. In the distribution branch it is possible that wooden kegs may be supplanted in part by metal drums. Just as the stainless steel

milk can has been found efficient and profitable by certain dairies, although the initial cost is about triple that of a can of dairy tin plate, so the German brewers have been adopting metal kegs or drums. Stainless steel has been used and also nickel and aluminum. In the case of rustless steel, the cost in the United States is about triple that of the former container for beer, the wooden keg. While the nickel drums used for beer in the past were of pure metal and expensive, development of nickel clad steel now offers another material suitable for these drums. Aluminum is said to have proved quite satisfactory for this purpose and not long ago 6000 such containers made in the United States were shipped to Mexico for beer transport.

The possibility of a wide use of such containers by American brewers is suggested by the fact that German fabricators are producing 2000 to 5000 such units of stainless steel annually. These represent an aggregate of 1,000,000 liters (264,000 gallons) capacity, distributed in containers ranging from $1\frac{1}{3}$ to 132 gallons each. They are not only used in domestic delivery of beer in Germany, but have proved especially useful for export.

Certain German brewers are using them for transporting their beverage to Chile, South Africa and other overseas markets. Emptied, the drums are ready for use again and in certain markets are refilled with native wine for return to Germany, an exchange of contents scarcely possible with wooden casks, which, after absorbing wine, are considered unfit for other purposes.

A special advantage claimed in Germany for metal drums is lightness. It is said that a truck can transport 1050 gallons in stainless steel barrels, compared with only 780 gallons in wooden kegs.

The barrels or drums, as manufactured in Germany, and also in other countries, usually consist of two halves, each of which is drawn to the required depth, after which it is given a rib around the circumference, intended to stiffen and permit easy rolling. Projection rings are spot-welded to the heads of the barrel to permit it to stand firmly upright and prevent serious damage in handling. When completed the two halves are welded together.

The possibility of heat transference through the metal to the brew when exposed for any length of time to the sun may be a factor in deterring brewers from widespread adoption of the metal container. Nevertheless, the fact remains that German, British and other foreign brewers seem to have found the metal drum satisfactory, whether of stainless steel, nickel or aluminum. This possible disadvantage may be completely outweighed by lightness, cleanliness and longer life.

EDITORIAL COMMENT

Holds Out Hope for Steel

WITH but one justice dissenting, the United States Supreme Court's decision, as summarized in *THE IRON AGE* of March 16, is that the Appalachian Coals, Inc., selling agency for 137 producers of bituminous coal in Kentucky, Tennessee, Virginia and West Virginia, does not violate the Sherman anti-trust act. There will be widespread satisfaction at this outcome, for the selling agency plan, on the testimony of many investigators, was the one out of all the so-called remedies developed by the Hoover commission that gave any real promise of life for the soft coal industry.

The Government had contended that even though the defendants could not fix prices their cooperation would tend to stabilize prices and make them higher. But the court held that "a cooperative enterprise, otherwise free from objection, which carries with it no monopolistic menace, is not to be condemned." And further:

"The fact that the correction of abuses may tend to stabilize a business, or to produce fairer price levels, does not mean that the abuses should go uncorrected or that cooperative endeavor to correct them necessarily constitutes an unreasonable restraint of trade."

Not since the famous "rule of reason" definition in the Standard Oil Co. decision of 1911 has there been so noteworthy a deliverance by the Federal Supreme Court in all the wide range of litigation under the Sherman act. It is of special significance to the steel industry in the situation that so long has proved baffling to its best minds. That situation, it is true, may not be worked out by the formula of the Appalachian soft coal trade. However, it should yet prove to be amenable to a remedy which Chief Justice Hughes describes as "voluntary action to rescue and preserve these (competitive) opportunities and thus to aid in relieving a depressed industry and in reviving commerce by placing competition upon a sounder basis."

Labor Asks for Improved Equipment

IT is a curious anomaly that at a time when the popular notion is that workers are looking with suspicion and dread on the machine as their most devastating competitor, the strikers in a mid-western city should have included in their demands more efficient equipment with which to work. This would seem to be recognition of the fact that the more modern the machinery in a factory, the more efficient is the operator, and the greater the likelihood of profits to the management and steady employment for the worker.

Apparently the theorists who scarcely ever step inside the four walls of a manufacturing plant, but who pretend to know and speak the minds of the workers, are assuming too much when they talk about labor's abhorrence of the machine. Perhaps it would be nearer right

to say that workers are more intelligent than is generally thought by these theorists, and that they recognize the futility of trying to block progress along mechanical lines by artificial means. To make such an attempt is to prolong the present uncertainty and delay the return of better times.

National Credit, The Corner Stone

ASIDE from establishment of our banking system on a firm foundation, balancing of the national budget is the most important task of our Federal Government. Moving with a swiftness and decisiveness which engenders public confidence, President Roosevelt has secured from Congress the authority to accomplish this task by effecting downward revision of veterans' compensations and reductions in salaries of federal employees.

So far as veterans' expenditures are concerned, Congress heretofore has done nothing to stem their increasing flow. This is because the American Legion, organized by Congressional districts, for years has intimidated our national legislators. It decreed political death for those who dared oppose its raids on the public treasury. Until faced by a grave emergency, Congress therefore has sidestepped the job of plugging up the hole in the federal money barrel through which hundreds of millions have been flowing annually into the pockets of veterans whose disability had no connection with war service. This drain, amounting to a public scandal, the President now proposes to end through executive mandate, thus relieving Congress of a thankless and heretofore impossible task.

President Roosevelt likewise received authority to make substantial reductions in federal salaries. This will be only a part of his program to eliminate waste in Government which in recent years has grown to unprecedented proportions.

In this effort to bring outgo into balance with income, the President should have the wholehearted support of every citizen. His words, addressed to Congress, remind us forcefully that national credit is the Corner Stone of our economic life. "It (the national deficit) has contributed to the recent collapse of our banking structure. It has accentuated the stagnation of the economic life of our people. It has added to the ranks of the unemployed. Upon the unimpaired credit of the United States government rest the safety of deposits, the security of insurance policies, the activity of industrial enterprises, the value of our agricultural products and the availability of employment. The credit of the United States Government definitely affects these fundamental human values. It therefore becomes our first concern to make secure the foundation. National recovery depends upon it."

With so much at stake affecting the life of the nation, "the benefits of some must be subordinated to the needs of all."

National Industrial Dictators Urged by G. P. Torrence

President of Link-Belt Co. Recommends Direct Control of Supply to Sustain Prices

DECLARING that an unprofitable industry is "unsocial" and a hazard to other industries, George Paull Torrence, president of the Link-Belt Co., Chicago, urges direct control of supply through national dictators. His plan, which he recommends for agriculture, and for the steel, coal, oil and lumber industries, has the advantage of being free from the complication of price fixing and processing taxes, although calculated to produce the same results.

"The establishment of industry dictators," he says, "would be a partial revival of the powers of the War Industries Board. . . The emergency is just as great as in 1917, and just as definitely calls for prompt direct action, with the President in executive control."

He believes that the farm problem can be solved by reduction of acreage. His suggestion is that the President appoint a dictator for each major market crop—wheat, corn, oats and cotton. These dictators would be responsible to, or would themselves form, the Federal Farm Board. Each dictator would be given authority to limit the acreage of any crop to some fixed percentage of a five-year average for each farm. A license to market this crop would be given to a farmer only after he had conformed to the regulations. Suitable penalties would be provided for anyone who

bought unlicensed commodities. In the beginning the system would be confined to the basic commodities, not including live stock, on the supposition that the price of corn and oats will control the live stock prices.

There is a great need for similar control of production in the bituminous coal industry, according to Mr. Torrence. "Let Congress declare that the bituminous coal industry is exempt from the anti-trust acts, and at the same time give the Federal Trade Commission full power to pass on any rules and regulations governing the industry before they are put into effect, thus letting the commission judge what is for the public good, as well as for the good of the industry. As a safeguard the law should provide that the rulings could be appealed to the Supreme Court by any interested party. The rules made should be binding on the industry. This could be made effective by a system of licensing, or in some other way. The rules could include limitation of output, cooperative sales agencies, specifications for the coal itself, prices and terms of sale, labor rates, consolidations, closing of mines, and anything that is required to make the industry orderly, efficient and profitable."

The managements of the mines would make the rules through a trade

association and appoint the dictator or director to enforce them, according to Mr. Torrence's plan. The trade association should represent at least 75 per cent of the industry. The Federal Trade Commission would hear any minority recommendations on any rules before it for approval or alteration.

Similar dictators should be appointed for the lumber and oil industries, in Mr. Torrence's view. Among the manufacturing industries he believes that the plan should be limited to iron and steel. This is because the iron and steel business is the largest basic manufacturing industry and affects a large number of industries using iron and steel.

The stabilization of these industries, Mr. Torrence contends, could be accomplished without swamping the Federal Trade Commission. With successful history in connection with these as a guide, the plan could be extended to other lines.

Rockford, Ill., Stages "Confidence" Parade

A four-mile "confidence" parade, conceived early in the morning of March 15 and staged that afternoon, was the way in which the people of Rockford, Ill., celebrated the opening of its banks and at the same time took occasion to demand of its representatives at Washington support of banking and economy measures.

The parade was sponsored by the Rockford Chamber of Commerce. Telephone calls and frequent broadcasts by the local radio stations quickly brought out the marchers and thousands who viewed the parade from the sidelines.



Welded Seismic-Braced Building Undamaged by Earthquake

UNDER the repeated shocks of the recent southern California earthquake, the welded seismic-braced Edison Building at Los Angeles suffered no damage, according to H. H. Tracy, structural engineer, Southern California Edison Co. In a telegram to the Lincoln Electric Co., Cleveland, Mr. Tracy says: "Edison Building described in my paper in second Lincoln arc welding prize competition withstood recent earthquakes entirely without damage."

The building, consisting of 13 office floors and three penthouse floors, is a class "A" structure with steel frame, and was designed to resist shocks comparable to those produced

by the San Francisco earthquake of 1906. The recent quakes provided a rigorous test of the engineering design and of the construction.

According to the paper submitted by Mr. Tracy in the Lincoln competition, and which won third prize, welding increased the strength and rigidity of the structure and was less expensive than any other form of seismic bracing. The paper, under the title of "Application of Arc Welding to the Design of Steel Buildings for the Resistance of Earthquake Forces," is included with other prize papers in the book "Designing for Arc Welding," published by the Lincoln company.

SUMMARY OF THE WEEK'S BUSINESS

Pig Iron and Scrap Markets Reflect More Confident Feeling in Trade

Steel Orders and Production Still Suffering From Effects of Bank Closings
—Automobile Industry Resumes Partial Operations

THE iron and steel industry and its customers have not recovered from the bank crisis, the effects of which are being felt to a greater extent in steel orders and operations than a week ago. However, in pig iron and scrap a marked enlivening of markets has occurred, resulting in the heaviest sales of pig iron in many months and a further advance of 25c. a ton in heavy melting steel scrap at Pittsburgh, the second of that amount within two weeks. Eastern Pennsylvania pig iron in substantial tonnage has been sold to two large consumers for forward delivery at prices 50c. to \$1 a ton above current quotations, foreshadowing a general increase in prices in that district, while at Chicago and Cleveland there have been decided gains in both sales and inquiries, tonnage booked at Chicago in the week having been the largest for any like period since 1930.

Steel ingot production for the country as a whole has declined this week to 14 per cent of capacity. Only at Cleveland has there been an increase in operations, brought about by the resumption on automobile steel orders by one plant that had been idle. This gain has brought the Cleveland rate up to 29 per cent from 17 per cent last week, but has not been sufficient to offset declines at Pittsburgh and Chicago, which together have nearly a half of the country's steel ingot capacity, or in other important steel-producing districts. The Pittsburgh rate has dropped to 13 per cent and Chicago plants average only 11 per cent. Tonnage booked by Pittsburgh mills in the past week was the smallest during the entire depression.

WHILE the exuberance that immediately followed the reopening of banks and exchange markets has evaporated with the sober realization of all that remains to be done to restore a normal flow of business, a strong and widespread feeling of confidence exists. This is especially in evidence among steel producers, who, knowing the length of time required to start the wheels of industry moving after a severe breakdown, have been modest in their expectations of nearby improvement.

However, the steel industry looks for visible gains beginning this week or next, despite the fact that two of its principal outlets, building construction and the railroads, do not offer immediate prospects for important tonnage. The lag in building construction has been intensified by hold-ups due to the credit situation, lettings of fabricated structural steel having amounted only to 4050 tons, the smallest weekly

total this year, while railroad buying will undoubtedly wait upon the completion of a rehabilitation plan at Washington. Of the structural steel awards, 1000 tons was for a brewery addition at Milwaukee.

A start toward resumption of the former scale of activity by the automobile industry has resulted in the release of sizable orders by the Ford Motor Co. and other makers, the Ford business having been largely in bars and spring steel, which it usually rolls in its own plant, but which will be furnished in part by another Detroit mill. Other automobile companies have released tonnage that had been suspended, but the effect of this upon operations has been felt principally at Cleveland. The automobile industry, while approaching its recent schedules gradually, looks forward confidently to a bulge in retail sales not later than the middle of April, and is shaping its plans accordingly.

DEVELOPMENTS of interest as indicating the future trend have had mainly to do with prices. Although pig iron has stiffened only at Philadelphia, sellers in all markets are declining to quote for delivery beyond the end of the second quarter. The revival of pig iron inquiry throughout the country is a probable reflection of the ideas of melters that prices will advance with any continued increase in the demand. Unlike steel, which is usually sold on optional contracts, pig iron business is bought only on a firm and non-cancellable basis.

Scrap markets show a firm undertone, but the only buying flurry has occurred at Pittsburgh, where No. 1 railroad steel scrap, which brings a premium over ordinary No. 1 steel scrap, has been sold at \$10 a ton. The minimum for No. 1 heavy melting steel is \$8.50. THE IRON AGE composite price for this grade has risen to \$7 a ton, the highest since November.

Finished steel prices are stronger with respect to concessions, but the affirmation of present quotations for the second quarter has slowed up consumers in making contracts, though some commitments of a routine character have been entered into. An interesting phase of the steel price situation is the desire of some large buyers to secure protection for the remainder of the year at present prices. A large automobile company has asked all of its suppliers for such a guarantee against advance, and an important Eastern railroad has requested such protection through the third quarter. Thus far steel companies are averse to booking any business or giving protection for the last half of the year. Some sheet producers are quoting all prices subject to withdrawal.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron

Per Gross Ton:

	Mar. 21, 1933	Mar. 14, 1933	Feb. 21, 1933	Mar. 22, 1932
No. 2 fdy., Philadelphia.....	\$13.34	\$13.34	\$13.34	\$15.59
No. 2, Valley furnace.....	14.50	14.50	14.50	15.00
No. 2 Southern, Cin'ti.....	13.82	13.82	13.82	13.82
No. 2, Birmingham.....	11.00	11.00	11.00	11.00
No. 2 foundry, Chicago*.....	15.50	15.50	15.50	16.50
Basic, del'd eastern Pa.....	13.50	13.50	13.50	16.00
Basic, Valley furnace.....	13.50	13.50	13.50	14.50
Valley Bessemer, del'd P'gh	16.89	16.89	16.89	17.39
Malleable, Chicago*.....	15.50	15.50	15.50	16.50
Malleable, Valley.....	14.50	14.50	14.50	15.50
L. S. charcoal, Chicago.....	23.17	23.17	23.17	23.17
Ferromanganese, seab'd car-				
lots.....	†68.00	68.00	68.00	75.00

* The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

† Contract price; spot quotation.

Rails, Billets, etc.

Per Gross Ton:

	Mar. 21, 1933	Mar. 14, 1933	Feb. 21, 1933	Mar. 22, 1932
Rails, heavy, at mill.....	\$40.00	\$40.00	\$40.00	\$43.00
Light rails at mill.....	30.00	30.00	30.00	34.00
Rerolling billets, Pittsburgh.	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh..	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh.....	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.60	1.60	1.60	1.50

Finished Steel

Per Lb. to Large Buyers:

	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.60	1.60	1.60	1.50
Bars, Chicago.....	1.70	1.70	1.70	1.70
Bars, Cleveland.....	1.65	1.65	1.65	1.65
Bars, New York.....	1.95	1.95	1.95	1.85
Tank plates, Pittsburgh.....	1.60	1.60	1.60	1.50
Tank plates, Chicago.....	1.70	1.70	1.70	1.70
Tank plates, New York.....	1.648	1.648	1.698	1.798
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.50
Structural shapes, Chicago..	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.76775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	2.00
Hot-rolled strips, Pittsburgh	1.45	1.45	1.45	1.40
Cold-rolled strips, Pittsburgh	1.80	1.80	1.80	2.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Finished Steel

Per Lb. to Large Buyers:

	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.00	2.00	2.00	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill..	2.10	2.10	2.00	2.30
Sheets, galv., No. 24, P'gh..	2.60	2.60	2.50	2.85
Sheets, galv., No. 24, Chicago dist. mill.....	2.70	2.70	2.50	2.95
Hot-rolled sheets, No. 10, P'gh	1.40	1.40	1.45	1.55
Hot-rolled sheets No. 10, Chicago dist. mill.....	1.50	1.50	1.55	1.65
Wire nails, Pittsburgh.....	1.85	1.85	1.85	1.95
Wire nails, Chicago dist. mill	1.90	1.90	1.90	2.00
Plain wire, Pittsburgh.....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., Pittsburgh	2.35	2.35	2.35	2.60
Barbed wire, galv., Chicago dist. mill.....	2.40	2.40	2.40	2.65
Tin plate, 100 lb. box, P'gh.	\$4.25	\$4.25	\$4.25	\$4.75

Old Material

Per Gross Ton:

	Mar. 21, 1933	Mar. 14, 1933	Feb. 21, 1933	Mar. 22, 1932
Heavy melting steel, P'gh..	\$9.00	\$8.75	\$8.50	\$10.25
Heavy melting steel, Phila...	6.75	6.75	6.75	7.25
Heavy melting steel, Chicago	5.25	5.25	5.25	7.12½
Carwheels, Chicago.....	8.00	8.00	8.00	7.00
Carwheels, Philadelphia....	8.00	8.00	8.00	9.50
No. 1 cast, Pittsburgh.....	9.00	9.00	9.00	9.50
No. 1 cast, Philadelphia... ..	8.00	8.00	8.00	10.00
No. 1 cast, Ch'ego (net ton).	8.25	6.25	6.25	7.00
No. 1 R.R. wrot., Phila.	7.50	7.50	7.50	8.50
No. 1 R.R. wrot., Ch'go (net)	4.50	4.50	4.50	5.50

Coke, Connellsville

Per Net Ton at Oven:

	Mar. 21, 1933	Mar. 14, 1933	Feb. 21, 1933	Mar. 22, 1932
Furnace coke, prompt.....	\$1.75	\$1.75	\$1.75	\$2.25
Foundry coke, prompt.....	2.50	2.50	2.50	3.50

Metals

Per Lb. to Large Buyers:

	Cents	Cents	Cents	Cents
Electrolytic copper, refinery..	5.00	5.50	4.75	5.75
Lake copper, New York....	5.25	5.75	5.00	6.12½
Tin (Straits), New York....	23.90	24.12½	23.45	21.75
Zinc, East St. Louis.....	3.15	3.20	2.60	2.77½
Zinc, New York.....	3.52	3.57	2.97	3.14½
Lead, St. Louis.....	3.12½	3.22½	2.87½	3.00
Lead, New York.....	3.25	3.35	3.00	3.15
Antimony (Asiatic), N. Y...	5.95	6.25	5.62½	6.12½

The Iron Age Composite Prices

Finished Steel

March 21, 1933
One week ago
One month ago
One year ago

1.923c. a Lb.
1.923c.
1.923c.
1.933c.

Based on steel bars, beams, tank plates, wire rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.

	High	Low
1933.....	1.948c., Jan. 3;	1.923c., Jan. 17
1932.....	1.977c., Oct. 4;	1.926c., Feb. 2
1931.....	2.037c., Jan. 13;	1.945c., Dec. 29
1930.....	2.273c., Jan. 7;	2.018c., Dec. 9
1929.....	2.317c., April 2;	2.273c., Oct. 29
1928.....	2.286c., Dec. 11;	2.217c., July 17
1927.....	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$13.56 a Gross Ton
13.56
13.56
14.43

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
\$13.56, Jan. 3;	\$13.56, Jan. 3	
14.81, Jan. 5;	13.56, Dec. 6	
15.90, Jan. 6;	14.79, Dec. 15	
18.21, Jan. 7;	15.90, Dec. 16	
18.71, May 14;	18.21, Dec. 17	
18.59, Nov. 27;	17.04, July 24	
19.71, Jan. 4;	17.54, Nov. 1	

Steel Scrap

\$7.00 a Gross Ton
6.92
6.83
8.21

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	High	Low
\$7.00, Mar. 21;	\$6.75, Jan. 3	
8.50, Jan. 12;	6.42, July 5	
11.33, Jan. 6;	8.50, Dec. 29	
15.00, Feb. 18;	11.25, Dec. 9	
17.58, Jan. 29;	14.08, Dec. 3	
16.50, Dec. 31;	13.08, July 2	
15.25, Jan. 11;	18.08, Nov. 22	

Pittsburgh Scrap Prices Strong; Steel Operations at New Low

Heavy Melting Steel Advances 25c. a Ton—Inquiries for Steel Improve But Orders Are Light

PITTSBURGH, March 21.—The full effects of the recent bank holiday are now being felt by the local steel industry, with tonnage last week having reached a low point for the entire depression. While moderate recovery is expected this week, releases are slow to come in, and the recent improvement in sentiment is reflected principally in new inquiry.

Reports of resumption of activity in the automotive industry indicate improved demand from this source in the near future, but specifications for motor car manufacture have not yet come to Pittsburgh. No railroad buying has taken place, and the carriers are not likely to take action of any sort until plans for their rehabilitation are announced in Washington. Structural steel buying is light, and seasonal activity in the outdoor industries has been set back by flood conditions throughout the Ohio Valley.

Steel ingot production in the Pittsburgh district has failed to gain, and has even dropped off a point to 13 per cent this week. Output is also off in the Valleys and nearby northern Ohio plants, where scattered increases at independent mills have been offset by suspension at a large unit. Wheeling district output was reduced by high waters at one large plant last week, but will return to 25 per cent of capacity this week. One or two plants farther down the Ohio have been affected by the flood, but the high waters have apparently spent themselves in the Pittsburgh and Wheeling districts.

Finishing mill schedules have been generally lower, except in the case of tin plate, where production is up a few points to about 40 per cent of capacity. Sheet mill activity has declined to 15 per cent and production of other finished steel products is generally at a reduced level.

The prospect of improved commodity prices has given the steel market a stronger tone, which is reflected in heavier inquiry, principally from small consumers. A few buyers have asked for prices over the remainder of the year, and desire for a six-months' coverage is not uncommon. Mills, however, are unwilling to quote farther ahead than the second quarter, and have not yet taken many contracts for this period, except those of a routine character. In the raw materials markets stronger scrap prices are in prospect, but pig iron continues very quiet.

Pig Iron

No advance inquiry has come out in this district, although releases

have increased slightly. Prices are holding at recent levels in the absence of test.

Semi-Finished Steel

No second quarter inquiry is reported in this market, although makers are willing to take contracts for that period at \$26. Pittsburgh or Youngstown, for billets, slabs and sheet bars. A little forward contracting of forging billets has occurred. Wire rods continue quiet, with new inquiry somewhat heavier than releases.

Rails and Track Accessories

Railroad purchases are generally being held up pending announcement from Washington of a rehabilitation plan. Some quarterly inquiries of a routine nature have appeared, and the Pennsylvania will open bids on March 22 on a miscellaneous lot of material. Current releases of rails are lacking, and specifications for accessories are extremely light.

Bolts, Nuts and Rivets

New inquiry is slightly heavier, but specifications have not improved. Pittsburgh makers have shared in a recent order for bolts and nuts from the Navy Department. Producers are quoting on second quarter tonnage at the recent discounts.

Tubular Goods

Demand is holding its own, with movement of oil country goods showing up fairly well. Line pipe inquiry is still lacking, but makers report a fair amount of prospective tonnage which may come out as soon as financial conditions are improved. Movement of mechanical tubing has been sharply affected by suspension of activity in the automotive industry.

Bars, Plates and Shapes

This market is now undergoing the full effects of the recent bank holiday, with the demand for all the heavy hot-rolled products sharply curtailed. Structural awards are very light and very little reinforcing bar tonnage has been placed in the last week. Plates are also quiet, although prospective demand for river barges seems to have improved. A number of units which were destroyed by recent floods are likely to be replaced, and some new equipment is still before the trade. Some of the railroads have issued their quarterly routine inquiries, including 2500 tons of plates and shapes for the Norfolk & Western. Inquiry for merchant and alloy steel bars from small consumers has improved a little in the last

week, but is still well below February averages. Scarcely any specifications from the automotive industry are reaching this district. Producers of bars, plates and shapes are quoting 1.60c., Pittsburgh, on second quarter tonnage, and the figure seems to be more rigidly applied than has been the case in many months. Alloy steel bars are quoted at 2.45c. to 2.65c., Pittsburgh, the lower figure applying to large automotive consumers.

Wire Products

New inquiry is considerably heavier, but releases have not yet shown much improvement. Many jobbers are sounding out the market with the thought of replenishing their depleted stocks, and will unquestionably place orders in the near future if sentiment holds up. Manufacturers' wire is particularly dull. Prices are well maintained at \$1.85 a keg for nails, and 2.10c., Pittsburgh, on manufacturers' wire.

Sheets

Consumers of sheets are beginning to sound out the market for their forward requirements, although actual orders have not improved materially. Some makers have had requests to quote over the remainder of the year, but are generally refusing to commit themselves beyond the second quarter. Specifications have not picked up very much, but the resumption of a number of automotive plants this week will unquestionably lead to releases from these sources. Production declined further last week, and has not yet shown much improvement.

The recently announced prices are well maintained on such business as has been booked, and a thorough-going test is expected this week.

Tin Plate

Releases are beginning to show improvement, and operations have risen to nearly 40 per cent of capacity. Some mills are running at a much better rate, but the leading interest is holding to its recent level.

Strip Steel

Pittsburgh district mills have not yet felt the increase in specifications which resumption of production by automotive plants might be expected to bring. Current releases are very light, but new inquiry, particularly for small tonnages, has improved considerably. Some consumers are willing to cover their requirements for at least six months in advance, but mills are only quoting for the second quarter. The price of hot-rolled strip is well maintained at 1.45c., Pittsburgh, and quotations on cold-rolled continue nominal, with makers generally willing to extend old contracts.

Coke and Coal

Demand for both coal and coke is still very quiet, although releases of

foundry coke are expanding slightly. Makers of the premium grades have reduced their price 25c. a ton to \$4, Connellsville. On the cheaper grades prices are weak, and quotations of less than \$2.50, Connellsville, occasionally appear.

Scrap

Stronger demand for No. 1 railroad steel at two important consuming points and absence of buying of ordinary No. 1 heavy melting steel have given the local market a very strong tone in the last week. The railroad grade has brought \$10 or better, fully \$1 a ton over the price which ordinary steel would bring. On the other hand, one mill in the district will pay only \$8.25 for heavy melting steel, but is receiving only occasional distress orders at that figure. Under the circumstances, the market is quotable at a range of \$8.50 to \$9.50, with an average price of \$9. This price was paid recently for a small tonnage of No. 1 steel, and although \$9.50 does not represent the top of the market on the railroad grade, it is close to the figure which dealers have been bidding. The other grades of scrap are correspondingly strong, although little buying has occurred. One dealer is offering as high as \$9 for compressed sheets. Scarcely any scrap is coming into the Pittsburgh district from either the East or the Middle West, and the unwillingness of small dealers to part with material, together with light local production, has contributed to the strong tone of the market.

Motor Car Makers Resume Operations

(Concluded from Page 481)

to be another factor influencing the Ford company to push ahead vigorously. Even with the program definitely under way, it is considered unlikely that model 44 will be introduced before May 15 or June 1. Steel mills are expecting some tonnage from Ford this week covering April requirements. It is said that next month Ford will turn out about 40,000 of the large V-eights. This will be the most ambitious schedule at Dearborn since late last summer. Liggs and Murray are busy on Ford work.

Automobile Company Asks Protection on Steel for Rest of Year

A prominent automobile manufacturer has asked all of its suppliers, including steel companies, to guarantee protection of its requirements at present prices during the remainder of the year. Thus far no company has been willing to extend present quotations beyond the end of the second quarter, and sheet steel companies have not retreated from their position that users must pay higher prices next quarter. Chrysler gave some small steel releases the past week,

but has not yet closed its second quarter contracts.

Willys-Overland expects to begin production this week of 4000 trucks for International Harvester, the banking holiday having caused a delay through the temporary impounding of funds for this purpose. This work, requiring several thousand employees, will extend over the next three months.

The Studebaker Corp. went into friendly receivership Saturday due to legal entanglements in connection with its proposed merger with the White Motor Co., making it temporarily im-

possible to use its most valuable assets for credit purposes. It is expected that the receivership will be short lived. It does not involve the White Company or the Pierce Arrow Motor Car Co., both of which are Studebaker controlled. Studebaker is planning to start production tomorrow at its South Bend plant, which has been idle since the beginning of the national banking holiday.

Great Lakes Steel Corp. ran two of its six open-hearth furnaces the past week. It had previously been operating three furnaces and for a short time had on four furnaces.

United Kingdom Iron and Steel Business Continues to Improve

LONDON, England, March 20 (By Cable).—The iron and steel business of the United Kingdom continues to improve. Additional blast furnaces and steel plants are being put into operation. Tin plate demand is quiet but steady, with output at about 65 per cent of capacity. The tin plate pooling plan has been definitely extended until September, 1934.

Belgian steel plate mills are in a good position owing to Japanese orders, but the Continental steel market otherwise is quiet, awaiting decisions regarding operation under the cartel system. The meeting at Dusseldorf re-

sulted in no progress toward the formation of sales syndicates. Belgian and German representatives disagreed over the basis period to be used for calculating export quotas. Belgium threatened to cancel preliminary agreement if sales syndicates are not in operation by April 1. Another meeting will be held in Paris at the end of this month.

The Continental Tube Cartel has reached a provisional agreement for renewal for two years.

The Lorraine Works has booked 18,000 tons of steel for Russia.

Final allotment of South African orders now includes 17,000 tons of rails and fish plates placed with British mills and 20,500 tons of steel ties with Belgium, Luxemburg and Germany.

Vickers-Armstrong has received a contract from the E. W. Bliss Co., New York, for Bliss presses and canning machines.

Forecasts a Shortage in Steel Scrap

A shortage in steel-melting scrap will become manifest with any considerable expansion in steel-making activity, according to Lewis B. Lindemuth, consulting engineer, Chrysler Building, New York. In a lecture at Columbia University, March 14, he showed charts covering estimates of scrap accumulations over the years. These indicated that drafts on the available supplies had been so large in recent years that an actual deficiency is not far off. With the present tendency to use, if possible, increased percentages of scrap in basic open-hearth furnace charges and to reduce the cropping of the ingot and therefore the production of steel-plant scrap, the economic position of scrap, he pointed out, promises to become that much stronger.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	\$9		
Billets, open-hearth \$5		to \$5 7s. 6d.	
Black sheets, Japanese specifications	\$11		
Tin plate, per base box	15s.	9d. to 16s.	
Steel bars, open-hearth	\$7 17½s.	to \$8 7½s.	
Beams, open-hrth. \$7 7½s.		to \$7 17½s.	
Channels, open-hearth	\$7 12½s.	to \$8 2½s.	
Angles, open-hearth	\$7 7½s.	to \$7 17½s.	
Black sheets, No. 24 gage	\$8 10s.		
Galvanized sheets, No. 24 gage	\$10 10s.	to \$10 15s.	

Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86

Billets, Thomas	\$2 3s.		
Wire rods, No. 5 B.W.G.	\$4 10s.		
Black sheets, No. 31 gage, Japanese	\$11 5s.		
Steel bars, merchant	\$2 7s. 6d.		
Beams, Thomas	\$2 4s.		
Angles, Thomas, 4-in. and larger	\$2 6s.		
Angles, small	\$2 8s.		
Hoops and strip steel over 6-in. base	\$3 10s.		
Wire, plain, No. 8	\$5 7s. 6d.		
Wire nails	\$5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G. ..	\$3 15s.		

Chicago Pig Iron Trade Active; Steel Production Declines

Inquiries For Finished Steel Quite Numerous, But Sales and Specifications Are Lagging

CHICAGO, March 21. — Tendencies in the various phases of the iron and steel market are mixed. Steel ingot output, lacking support from automobile manufacturers, has dropped several points to an average of 11 per cent of capacity. While inquiries for finished steel are quite numerous, sales and specifications are lagging. On the other hand, sellers of pig iron have to go back to the closing months of 1930 to find a day or a week to match the performance of the market in the last week.

Scrap offers fair possibilities for a more active market. Cast grades, especially, are moving in greater volume, and inquiries are improved all along the line. Dealers are pinning their hopes on steel mill purchases, which they believe are in the not distant future. They reason that about \$6 a ton for heavy melting steel would have to be paid to bring out a large tonnage.

Farm implement manufacturers so far have derived little encouragement from their recent offers which guarantee grain prices above the open market.

A glance over structural awards and inquiries reveals a change in the general character of business. Highway bridge work is lighter and public work is playing a less important part in current transactions. The gap is being partially filled by private work, including 1000 tons for a brewery addition. Viewing the market as a whole, it is evident that confidence has not lessened.

Pig Iron

Inquiries that were active a week ago are rapidly turning into orders, and sellers find that they must go back to 1930 to find a period when sales equaled the volume of current transactions. There is no material change in shipments, but inquiries continue to come in at a good rate. Only one merchant stack is lighted, but producers' stocks are large and well balanced.

Bolts, Nuts and Rivets

Both inquiries and shipments still lag, but buyers, anticipating greater use and a possible advance in prices, are for the first time in more than a year eager to sign contracts for the coming quarter.

Reinforcing Bars

Dealers are slow to swing into a more optimistic frame of mind, largely because of the fact that inquiries are near an all-time low. However, there are a few bright spots. It is

estimated that about 500 tons of bars will be taken for brewery construction. Also a sales tax enactment has been passed by the Illinois legislature. It will provide needed funds for relief work, thereby permitting the gas tax fund to revert to road building operations. Dealers have not yet determined whether the new sales tax will be applied to reinforcing bar sales.

Cast Iron Pipe

Chicago is now in the market for about 10,000 tons of large diameter pipe. Included in the inquiry are 1350 tons of 30-in., 1100 tons of 36-in., and 7460 tons of 48-in. Fittings account for about 400 tons. Design of Chicago's new pumping plant is near completion and it is expected other preliminaries will be rushed. The purchase of cast iron pipe by Wilmette, Ill., is also near, the steel pipe for the water plant intake having already been bought. Private inquiries and purchases remain very light.

Cold-Rolled Strip

Output has dropped to about 9 per cent of capacity, but it now appears that the downward swing is halted, and there is prospect that the curve will from now on gradually swing upward. Prices are steady.

Wire Products

A number of second quarter contracts have been added to producers' books. There is still a disposition among some buyers to speculate, but sellers are primarily interested only in tonnages that will be moved in the next few months. From the viewpoint of wire producers, there must be a mark-up in farm products' prices before quotations on wire products can be moved up. Jobbers are quiet and are laboring under a difficult credit situation. The copper wire market is dull, but some utilities are making preliminary surveys of their needs. Output of wire products ranges from 20 to 25 per cent of capacity.

Structural Material

New awards total about 2000 tons, but fresh inquiries are not heavier than 800 tons. Specifications are now in the hands of bidders for the Federal Building at St. Louis. The Chicago Carton Co. is planning a new plant.

Rails and Track Supplies

Shipments of track supplies remain steady and there is prospect of early growth for spring maintenance work. Sellers believe that this increase in demand will come regardless of the

action taken by railroads in the matter of rails. There is no inkling of rail purchases that may be made this spring. The light rail market is quiet. Several inquiries for tonnages for export are still pending.

Plates

Denver, Colo., has awarded a contract for a steel water main to the Stearns-Rogers Co. It is expected that the 2000 tons of steel needed will be bought in the near future. Lock gates at Fountain City, Wis., will be fabricated in a plant near Milwaukee. Several small lots of plates are going into brewery rehabilitation. The brewing industry is showing keen interest in stainless steel and in stainless clad steel sheets. Several Western concerns are experimenting in the hope they can develop steel beer kegs. A lull has developed in large tank business.

Bars

This market is still depressed because of inactivity of automobile builders, some of whom are now beginning heavier schedules. When they closed down during the bank moratorium they had sufficient material to carry them well for a while under such schedules as they are now undertaking.

Sheets

Miscellaneous inquiry for sheets is much improved and a slight increase in orders is noted. Contracts for the second quarter are slow. Shipments are at the level of recent weeks. Prices are steady.

Scrap

A small lot of distress heavy melting steel has been taken by a mill at \$5.25 a ton, delivered. Dealers are more firmly of the opinion that a fair amount of buying will start prices upward. Sales are few, though cast wheels, malleable and cast scrap are being taken by consumers. Probably the most active buying group is the cast iron foundry industry. The Santa Fe has sold malleable at \$6.75 a ton and it is offering 2000 tons of heavy melting steel. The Burlington is preparing to offer a list.

Blaw-Knox Co. To Make Brewhouse Equipment

Blaw-Knox Co., Pittsburgh, has completed arrangements with Weigelwerk, A. G. of Germany to manufacture and install the latter's line of brewhouse equipment in the United States. With its more than 20 years' experience as a designer and manufacturer of equipment for chemical and food products plants, the Blaw-Knox Co. has devoted a long period of study and research to the art of brewing, which has been reinforced by the resources and experience of the Weigelwerk organization.

Eastern Pennsylvania Pig Iron Sold at Advance in Prices

Two Large Lots Bring 50c. a Ton Above Recent Quotations—
Current Steel Bookings Gain Slightly

PHILADELPHIA, March 21.—Improved sentiment in the iron and steel trade in this district has been translated into an actual but slight increase in business. Current bookings of steel have picked up to a point where they compare favorably with the February rate, with a mild upswing in inquiries giving promise of further acceleration. This has brought about a firmer tone, though so far prices remain unchanged. The rising tendency, however, has increased consumer interest. Makers of both pig iron and finished steel are not quoting beyond the second quarter.

The most marked improvement in the tone of the market is in pig iron. Sales are understood to have been made at level above the current quotations still maintained generally but which may see an early advance. There is also more active figuring on structural steel now that confidence has returned.

Steelworks operations, however, have fallen off one point the past week to 10 per cent of capacity, and another open-hearth furnace will close down in April. This drop is due to the stocking of raw steel; any buying movement would quickly absorb it and start increased operations.

Pig Iron

The market has taken on a much stronger tone. It is reported that two round tonnages of foundry iron have been sold by a maker in this district at 50c. a ton over current quotations. Other makers, however, have not changed their price levels, but if the improvement is maintained an early advance in prices appears to be in prospect. One eastern Pennsylvania maker is quoting an advance of 50c. to \$1 per ton for deliveries beyond the second quarter. The Alan Wood Steel Co. has definitely decided to continue operating its present active blast furnace at least through April.

Warehousing Business

Sales by jobbers thus far in March are somewhat heavier than those of February. The volume is not large.

Plates, Shapes and Bars

While there is better sentiment in the trade, new business has shown only a mild improvement. The tone of the market is stronger, though plates continue to be irregular. The Pennsylvania Railroad will open bids tomorrow on not to exceed 10,000 tons of miscellaneous steel. The material includes carwheels, axles, spikes, tie plates, sheets, angle bars,

rail joints, pipe and boiler tubes. The Sun Shipbuilding Co., Chester, Pa., has taken a barge for the Texas Co., requiring about 300 tons of steel.

Sheets

With the clearing up of the banking situation, improvement has become more pronounced in sheets. One automobile body builder in this district resumed operations yesterday, after being closed down by reason of the bank holiday, and has released fair-sized tonnages of sheets. Second

Valley Steel Industry Operating at About 15 Per Cent This Week

YOUNGSTOWN, March 21.—The local steel industry is beginning to recover from the lethargy brought about by the recent bank holiday. New buying continues to be restricted, but the normal flow of releases is being resumed and considerable new inquiry is appearing. Resumption of production this week by automotive plants in northern Ohio and Michigan has brought improved specifications, and small shipments to miscellaneous manufacturing consumers again show an upward tendency.

All the major producers in this district report a sharp falling off in tonnage this month, as compared with the corresponding February period. Pipe seems to have been affected less than other finished steel products, although tin plate production held up fairly well. Sheets, strip steel and bars reflected the greatest loss in tonnage. However, the move to stabilize sheet prices has given the market a much better tone and will unquestionably facilitate recovery of volume. The approach of mild weather is leading to additional inquiry for reinforcing bars, wire products, while fabricators of building products in the district are preparing to increase their orders.

Steel ingot production in the district slipped under the 15 per cent rate last week, and will probably average about 15 per cent this week. Tin plate production in the territory still averages about 50 per cent of capacity and sheet mills are engaged at about 20 per cent. Bar production is lower, but pipe mills are still engaged at about 10 per cent.

Producers of steel are prepared to take orders for all forms of steel into the second quarter at unchanged levels. The generally improved senti-

ment which has come about in the last week has given prices a much stronger undertone.

Imports

The following iron and steel imports were received here last week: 2350 tons of manganese ore from England, 100 tons of ferromanganese from Germany, and 35 tons of steel bands, 18 tons of steel bars and 15 tons of structural shapes from Belgium.

Scrap

No improvement has developed in scrap business. The tone of the market is firmer, however. Some mills still are deferring shipments, while others are taking deliveries. A recent sale of about 6000 tons of armor scrap was made to a German maker. One shipload moved out from Philadelphia last week and another will go forward this week.

Raw material prices in the district have not changed appreciably except in the case of scrap. The market is definitely stronger, especially from the standpoint of dealers who are unable to buy profitably against recent low-priced orders. The last reported sale of No. 1 heavy melting steel was at \$8.50, although dealers are unwilling to sell at this figure today and would hardly be willing to dispose of any significant tonnage at \$9. The cheaper grades of scrap are correspondingly stronger.

Boston Pig Iron Inquiry Shows a Slight Increase

BOSTON, March 21.—A slight increase in pig iron inquiry is reported. Individual tonnages are not large, the largest being 300 tons, and are for delivery this month and in the second quarter. Foundries inquiring are doing so in anticipation of higher prices. Sales the past week were unimportant. Prices on domestic brands and Indian iron are firmly maintained. Foundries in the Bridgeport, Conn., and Providence, R. I., areas can secure Dutch iron at prices considerably below those quoted on domestic iron. There has been no appreciable increase in the New England melt of iron.

The scrap market continues in the doldrums, now that there has been a halt in the export movement. There is, however, a demand for chemical borings, and occasionally a car or two of No. 1 heavy melting steel, breakable cast and engine blocks are moved.

Cleveland Steel Output Rises; Automobile Orders Released

Production Gains 12 Points With Resumption by Otis Plant—General Business Still Restricted

CLEVELAND, March 21.—With the release of considerable steel tonnage by several leading automobile plants, which shut down because of the banking holiday, local ingot output was stepped up 12 points this week to 29 per cent of capacity by the resumption of operations of the steel plant of the Otis Steel Co., which put on four open-hearth furnaces. Finishing mills also have increased operations this week. The local Fisher Body plant, which makes Chevrolet bodies, resumed operations Monday.

While activity outside of the automotive field was rather light the past week, some improvement is in evidence this week. Steel business in Ohio is still being seriously affected by the credit situation that has resulted from restricted bank operations. While this situation is less acute than a week ago, two leading local banks have not yet effected reorganizations and are limiting withdrawals. Many other banks in industrial centers still have their activities similarly restricted.

There is virtually no demand from the railroads, and expected rail inquiries in this territory are being deferred. Consumers are showing considerable interest in second quarter contracts, quite a few of which have been closed, largely for bars and shapes, and some first quarter bar contracts have been extended through the second quarter. Present prices of 1.65c., Cleveland, for bars and 1.60c., Pittsburgh, for plates and shapes have been formally reaffirmed for the coming quarter. With a number of round-lot sales, the pig iron market is more active than for several months.

Pig Iron

Greater activity prevailed in the market the past week than for several months. Sales during the week in Ohio, Indiana and Michigan aggregated 10,000 tons or more in foundry and malleable iron. Considerable of this business was taken by Cleveland interests. Sales by one local interest aggregated 6000 tons. Most of the foundries whose round-lot inquiries were reported last week have closed for their iron and several new inquiries, aggregating 6000 tons in lots up to 1000 tons, have come out. Furnaces are not selling beyond the second quarter. Prices are unchanged.

Iron Ore

Consumption of Lake Superior ore in February amounted to 634,443 tons, a decrease of 26,673 tons from January. This compares with 1,174,-

494 tons in February last year. Furnace stocks March 1 amounted to 25,046,787 tons and there were 30,152,106 tons of ore at furnaces and Lake Erie docks on that date, as compared with 35,726,443 tons on the same date a year ago. Central district furnaces in February consumed 344,969 tons, a decrease of 6988 tons; Lake front furnaces used 284,785 tons, a decrease of 18,809 tons; all-rail furnaces consumed 2966 tons, a decrease of 1172 tons, and Eastern furnaces used 1723 tons, a gain of 296 tons. There were 40 furnaces in blast using Lake ore Feb. 28, a decrease of three for the month.

Sheets

Considerable tonnage recently held up by automobile manufacturers has been released, and this enabled some of the Ohio mills to resume operations at fair schedules this week. Miscellaneous inquiry has improved. Some second quarter contracts for specific tonnages have been placed. Producers are taking orders at present prices for sheets for delivery late in the year for specific building jobs.

Strip Steel

New releases came from some of the motor car manufacturers this week. Others released strip last week that has been rolled, and additional releases have not come from these sources. There is little miscellaneous demand. Little inquiry for second quarter contracts has come out since prices were reestablished at the present levels of 1.45c., Pittsburgh, for hot-rolled strip and 1.80c. to 2c., Cleveland, for cold-rolled material.

Bolts, Nuts and Screws

Demand for bolts and nuts is again picking up owing to release of shipments that were held up when banking difficulties developed. Makers started this week to close second quarter contracts at the reaffirmed discounts. New prices and new quantity differentials are being announced on upset head cap and set screws. The new discount on cap screws is 85, 10 and 10 for jobbers and large consumers, with a sliding scale up to 85 and 10 for smaller buyers. Upset set screws are 80 and 10 to leading distributors and 80 to smaller buyers. The new discounts represent a decline of about 10 per cent. Freight allowance is increased 15c. on 200 lb. or over.

Bars, Plates and Shapes

Demand for bars from the automotive field shows a moderate gain. Plates are quiet, although new inquiry continues to come from the brewing industry. Structural activ-

ity is still affected by the banking situation, and new inquiry is lacking. The Columbus post office, requiring 3000 tons, is expected to be placed this week.

Scrap

The market has a firmer tone and prices are higher on blast furnace grades. A Cleveland consumer has released a small tonnage of blast furnace materials, and dealers have covered for these grades at around \$4.85.

Birmingham Iron Makers Hopeful for Improvement

BIRMINGHAM, March 21.—With the tangle created by the banking holiday steadily, though slowly, becoming adjusted, Birmingham pig iron producers are hopeful of a better situation. The market outlook is firmer. The Woodward Iron Co. is the only merchant producer with an active stack. The Sloss-Sheffield Steel & Iron Co. and the Republic Steel Corp., with furnaces banked, are shipping from stocks. It is thought that pressure pipe requirements will improve, since there is considerable municipal work in prospect for unemployment relief. Stove requirements may also respond to spring sales activities. Finished stocks of most stove manufacturers are said to be low and additional operations will be necessary if bookings are of any size. Pig iron shipments during the past week were not particularly changed, the aggregate still being small. More interest was apparent, though, in second quarter iron, and it is understood that several thousand tons of forward business was booked. Quotations remain at \$11 for the Southern market.

Steel

Bookings of the local steel manufacturers are still mostly in small lots. The new tonnage of one company last week showed an increase, while another company did not book quite as much as during the preceding week. Specifications against contracts were somewhat improved last week. A number of suspensions which came during the banking holiday were also lifted last week. Jobbers' demand is improving after having been sharply restricted. Mill schedules and open-hearth operations are varying but little from week to week. During most of last week five open-hearths were active, with three the remainder of the time. The same rate is scheduled for this week.

Detroit Scrap Market Quiet But Firm

DETROIT, MICH., March 21.—The local scrap market is drifting pending an anticipated upturn in automobile production and in steel mill operations. In the absence of transactions to test the market, prices continue to show strength, but are unchanged.

New York Steel Business Has Shown No Appreciable Gain

Some Releases Against Contracts Received by Mills—Pig Iron Buying More Active

NEW YORK, March 21.—Except for the release of some contract specifications that had been held up during the banking holiday, steel business in the New York area has shown no pick-up in the past week. Most of the steel sales offices had a little larger aggregate tonnage in the past week than in the week preceding, but there was scarcely any new business in the week's bookings.

Some contracts for first quarter were entered, but there is no great rush on the part of steel users to make contracts, since the mills have indicated that coverage for the next three-months' period will be made at present prices. Nor are the steel companies particularly anxious to make contracts, as they hope to get the benefit as soon as possible from whatever stiffening there might be in the general structure of prices. A large railroad has asked steel companies to extend present price protection through the third quarter, but nearly all steel makers have declined to do so.

A fair degree of stability exists in the steel price structure with the exception of plates, on which low quotations are still being made. However, some of the Eastern plate manufacturers are adopting a somewhat firmer attitude.

Pig Iron

Sales of 2000 tons last week were the largest for any week during the past four or five months. Southern iron, for the first time in more than a year, was a prominent participant in bookings, which covered prompt and second quarter delivery. Current inquiry is featured by a round lot for delivery into third quarter to a New Britain, Conn., foundry. Other interest is limited to carlots. Prices, though unchanged, are absorbing strength from several factors. Most sellers are restricting offerings to shipment through second quarter. Furnace stocks at idle stacks, though still of generous proportions, represent chiefly the steel-making grades. A gradually increasing shortage of normal foundry grades is consequently creating a firm price tone. Another factor is the generally low point of consumer inventories, which, in the event of even a slight pick-up in business, will face imperative replenishment. The domestic price situation is abetted further by reports that foreign sellers are harboring higher price views and will shortly attempt to realize better values at certain seaboard points.

Reinforcing Bars

Important inquiry was lacking during the week. Sizable lettings in immediate prospect are limited to several highway projects in New Jersey. Although bids were opened recently on about 2700 tons for the Connecticut State River bridge at Hartford, further action must await outcome of legislation to provide funds for this project. Army barracks at Plattsburg, N. Y., and at West Point, N. Y., accounted for 420 tons of awards in the past week. About 300 tons was placed for two destructor plants in New York. Prices are fairly steady at recent levels.

Scrap

Domestic interest, while improved, has failed thus far to crystallize into buying. Heavy melting steel is still being loaded for export shipment against standing orders. At unchanged prices, No. 1 and No. 2 steels are strong. Strength of these grades in other districts has fostered a growing reluctance of brokers here to enter into further export commitments at current prices. Foreign buyers, on the other hand, have evidently not yet displayed eagerness to cover for additional tonnage at higher values. Interest in the local scrap trade has already been aroused by the coming conference at Washington respecting Russia. Though eventual recognition of that nation by the United States will probably hinge on more than ex-Governor La Follette's report, dealers are already anticipating the potentialities of Russia as a future market for American scrap.

Cincinnati Pig Iron Trade Improves

CINCINNATI, March 21.—Clearing of the financial situation the past week stimulated activity in the district pig iron market. Consumer interest in covering for next quarter and a tendency to build inventories in anticipation of better business were noticeable. Total sales were close to 1000 tons. Two southern Ohio melters took 300 tons and 150 tons of Northern foundry iron respectively. Prices on these sales figured \$13, base, Cleveland, the usual quotation on Northern iron this quarter. A stronger tone to quotations on both Northern and Southern iron is noticeable, and the trade feels that higher prices will result shortly. An inquiry for 1200 tons of Northern foundry iron, the largest received this quarter, is current, but

other pending business is small. The melt is still low, but a marked increase in inquiry for castings gives a more optimistic outlook to the foundry market. In fact, melters generally are showing increased interest in accepting shipments of iron on old contracts, with a view to building inventories.

Steel

Lack of activity among automotive manufacturers is reflected in slow sheet specifications. Bookings the past week were near 25 per cent of capacity.

Scrap

Better feeling is apparent in the district scrap market. Dealers' bids on heavy melting steel advanced 25c. the past week, and further increases are expected.

Buffalo Furnaces Get Second Quarter Inquiries

BUFFALO, March 21.—A considerably more optimistic feeling pervades the pig iron market, with somewhat more interest in forward buying. Inquiries are out for several 100, 200 and 500-ton lots for April, May and June delivery. It is probable that a good many of these inquiries will be closed within the next week. This is the first time in a long period that there has been any inquiry for delivery beyond 30 days. The going prices for Buffalo iron in New England are around \$18 barge delivery, and \$19.05 all-rail delivery.

Steel

The Lackawanna plant of the Bethlehem Steel Co. is operating three furnaces and Republic Steel and Wickwire Spencer are each operating one. An increase is noted in the volume of inquiry for small lots of reinforcing bars.

Scrap

The tone of the market has changed materially in the past week. All items in the list are stronger and it is practically impossible to buy a tonnage at present quoted prices. The general opinion is that a tonnage of No. 1 heavy melting steel would sell now at between \$8 and \$9. Dealers are finding it almost impossible to buy at prices quoted two weeks ago. The Pittsburgh market is stronger, and this is influencing the Buffalo market to the extent that scrap from central New York points, instead of coming to Buffalo, is going to Pittsburgh.

Laclede Steel Co., St. Louis, reports a net loss of \$110,206 for 1932, compared with net income of \$148,416 in 1931. The company had a gross profit after all expenses of \$62,736, and made provision for depreciation and obsolescence of \$172,659. During the year, dividends amounted to \$144,375. Current assets December 31 were \$2,084,776 and current liabilities, \$89,816.

Fabricated Structural Steel

Lettings and New Projects in Small Volume

AWARDS of 4050 tons are the smallest for any week this year and compare with 6000 tons a week ago. The largest booking was 1270 tons for Lock No. 5 on the Mississippi River at Fountain City, Wis. A brewery in Milwaukee accounts for 1000 tons. New projects are also light, totaling only 2150 tons against 22,600 tons in the previous week and 1600 tons two weeks ago. Awards follow:

NORTH ATLANTIC STATES

Littleton, N. H., 120 tons, post office, to Shippers Car Line Co.

Fort Jay, N. Y., 155 tons, officers' apartment, to Lehigh Structural Steel Co.

THE SOUTH

Lexington, Ky., 840 tons, narcotic farm, to Duffin Iron Works.

CENTRAL STATES

Grayling, Mich., 160 tons, State highway bridge, to Pittsburgh-Des Moines Steel Co.

State of Kansas, 100 tons, highway bridge in Chase County, to Pittsburgh-Des Moines Steel Co.

Fountain City, Wis., 1270 tons, Lock No. 5, Mississippi River, to Lakeside Bridge Co.

Chicago, 125 tons, World's Fair structure to Johnston Iron Works.

Chicago, 150 tons, pavilion, at World's Fair, to Gage Structural Steel Co.

Milwaukee, 1000 tons, Pabst Brewing Co., to Lakeside Bridge & Steel Co.

WESTERN STATES

Vernon, Cal., 100 tons, brewery for Vernon Brewery Co., to Pennsylvania Iron & Steel Co., Los Angeles; previously reported to Pacific Iron & Steel Co.

Salt Lake City, Utah, 115 tons, State highway bridge at Salt Air, to an unnamed bidder.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Boston, 200 tons, city hospital unit.

State of Connecticut, 17,000 tons, superstructure, bridge over Connecticut River at Hartford; John A. Roebling's Sons Co., low bidder.

State of New Jersey, 3500 tons, viaduct, route 21, section 1, Newark; George M. Brewster & Son, Inc., awarded general contract.

State of New Jersey, 900 tons, highway construction, route 29; P. T. Cox Contracting Co. awarded general contract.

Cornwells Heights, Pa., 200 tons, convent and chapel buildings for St. Elizabeth Convent.

SOUTH AND SOUTHWEST

Louisville & Nashville Railroad, 300 tons, bridge work.

El Reno, Okla., 400 tons, cell house and power house at Southwestern Reformatory.

CENTRAL STATES

Chicago & North Western, 200 tons, bridges.

Chicago, tonnage not stated, plant for Chicago Carton Co.

Chicago, 150 tons, Oriental village for Century of Progress.

WESTERN STATES

Colorado Springs, Colo., 150 tons, addition to Printers' Home.

Kit Carson County, Colo., 134 tons, State highway structure; bids March 28.

San Francisco, 190 tons, Emporium warehouse addition, bids under advisement.

Oakland, Cal., 100 tons, College of St. Albert, bids under advisement.

Pend Oreille County, Wash., 123 tons, bridge over Slate Creek; bids March 29.

FABRICATED PLATE

AWARDS

Port Washington, N. Y., 135 tons, 100,000-gal. standpipe, to Chicago Bridge & Iron Works.

Mobile, Ala., 175 tons, two barges for United States Engineers, to Midland Barge Co.

Denver, 2000 tons, water pipe; Stearns Rogers Co., general contractor.

Los Angeles, 400 tons, 24- and 30-in. welded steel pipe, to Western Pipe & Steel Co.

Pacific Coast Quotations on Sheets Reduced

SAN FRANCISCO, March 20.—It is announced at Seattle, that bids will be opened on April 12 on the Railway Avenue seawall, which will require approximately 1678 tons of reinforcing bars, 5690 tons of sheet piling and 770 tons of cast iron pipe. Although this project has been pending for nearly a year, a definite date for bids has just been set. It is also reported that bids may be opened on April 12 for the Diablo power house and a double transmission line from the Skagit River, to cost approximately \$1,500,000. At Los Angeles, plans are being prepared for 430 ft. steel girder bridge, which involves an unannounced steel tonnage. It is understood that supplementary bids will be taken on the Federal Building at San Francisco, as the original bids exceeded the appropriation. As originally figured, this building would have required 700 tons of reinforcing steel and 4000 tons of structural steel. The contract for a floating dry dock for the Navy base at San Diego, requiring 4500 tons of plates, was awarded to the Dravo Contracting Co., which will, it is reported, construct the dry dock in the East and tow it to San Diego.

Although sheet prices have been weak for some time, a change of schedule has just been announced. Pacific Coast port prices on No. 10 hot-rolled annealed are now 2.02½c. a lb.; No. 24 hot-rolled annealed, 2.65c., and No. 24 galvanized sheets, 3.25c. Warehouse prices at San Francisco are now 3.70c. a lb. on No. 24 hot-rolled annealed, 3.07½c. on No. 10 hot-rolled annealed and 4.30c. on No. 24 galvanized sheets. Plate prices are weak, but no change of schedule has been announced. In steel circles on the Pacific Coast

there is a definite feeling that prices will strengthen shortly.

The devastating earthquake in southern California will undoubtedly have a good effect on the local steel market, as there is considerable reconstruction to be done, and building codes throughout California are being changed to require buildings to be quake-proof.

Reinforcing Steel

Awards 1125 Tons

Willard, N. Y., 110 tons, hospital, to Concrete Steel Co.

Plattsburg, N. Y., 250 tons, infantry barracks, to Joseph T. Ryerson & Son, Inc.

West Point, N. Y., 170 tons, service detachment barracks, to Truscon Steel Co.

New York, 300 tons, two destructor plants, to Joseph T. Ryerson & Son, Inc.

State of New Jersey, 175 tons, highway construction at New Brunswick, to Truscon Steel Co.

Sunnyvale, Cal., 120 tons, balloon hangar, to W. S. Wetenhall Co.

NEW REINFORCING BAR PROJECTS

State of Connecticut, 2700 tons, substructure, bridge over Connecticut River at Hartford; Poirier McLane Corp., New York, low bidder.

State of New Jersey, 650 tons, viaduct, route 21, section 1, Newark; George M. Brewster & Son, Inc., awarded general contract.

Pipe Lines

Pure Oil Pipe Line Co., a subsidiary of Pure Oil Co., Chicago, has approved immediate construction of new 3- to 6-in. diameter steel pipe line, from Otway, Mich., to refinery of parent company at Midland, Mich., about 10 miles.

Hemet, Cal., plans purchase of about 15,600 ft. of 10-in. electric welded steel pipe for main trunk line for new water system; also, cast iron pipe for distributing lines—4100 ft., 10-in.; 5960 ft., 8-in.; 23,900 ft., 6-in.; 35,720 ft., 4-in., and 11,510 ft., 2-in. Special election called on April 4 to vote bonds for \$121,000 for project.

Southern Union Gas Co., Conroe, Montgomery County, Tex., plans early construction of 34-mile 8 5/8-in. natural gas steel pipe line from Conroe field. Order for pipe has been placed with National Supply Co., Houston, Tex., and will be fabricated at plant of Spang, Chalfant & Co., Inc., Pittsburgh, an affiliated interest.

King County Water District No. 2, F. H. Greenslade, 2344 North 137th Street, Seattle, secretary, plans construction of pipe lines, including two 24-in. steel pipe mains for trunk line, or one 24-in. and one 20-in. line, as may be determined. Fred F. Weld, McDowell Building, Seattle, engineer.

Cheyenne, Wyo., Wyoming Public Service Commission has issued a permit for construction of a 33-mile oil pipe line between Maverick Springs field and Bonneville.

Railroad Equipment

United States Navy Department, Bureau of Supplies and Accounts, Washington, will take bids soon on two Diesel-electric 35-ton switching locomotives for Hawaiian service.

American Railway Association has ordered five sample A.R.A. standard steel 50-ton box cars from American Railway Car Institute, to be constructed by Pressed Steel Car Co., Pittsburgh.

Shipments of railroad locomotives in February consisted of seven, all electric, for domestic account. January shipments consisted of two electric locomotives, according to reports received by the Bureau of the Census.

Non-Ferrous Metal Prices Weaken As Demand Dwindles

Copper Drops 1/2c. a Lb.; Lead Reduced \$2 a Ton—
Tin Adversely Affected by Sterling Exchange

NEW YORK, March 21.—Under pressure of competitive offerings, the price of electrolytic copper has lost most of its recent gains. With virtually no demand existing at the 5.75c. price, custom smelters revised their quotations last Thursday to 5.50c., Connecticut, and again yesterday to 5.25c. Buying, however, has practically dried up since the flurry that accompanied the advances a week ago. Expectations that passage of the beer bill would uncover a moderate demand from copper sheet manufacturers have thus far been wanting. Most consumers have assumed a waiting attitude. Those buyers who covered at the recent high levels are expected to exercise particular caution in entering further commitments in view of the relatively quick reaction of prices to lower ground. Immediate prospects for expansion in trading are somewhat drab. A slight improvement in releases to the automobile industry is expected to follow resumption of activity in Detroit yesterday. Other consuming

lines, however, have not yet experienced a need to augment their present well-covered position with additional purchases of copper. Dealings abroad during the week were of minor importance. Fluctuations were narrow, with prices ranging between 5.05c. and 5.15c., c.i.f. usual Continental ports.

Tin

After having enjoyed a one-day spurt of buying on March 15, when spot Straits sold at 24.35c. a lb. New York, this market subsequently suffered a diminution of demand. The New York price, following a rise to 24.50c. on March 16, was influenced adversely by lower sterling exchange during the remainder of the week, falling today to 23.90c. Immediate support from consuming quarters is not likely, as most users have covered for their early wants. The lighter premiums now asked for future sterling have not furthered dealings in forward tin to any extent. London values remained steady throughout

the week. Quotations there this morning were £148 12s. 6d. a ton for spot standard, £149 10s. for future standard, and £154 7s. 6d. for spot Straits. Today's Singapore quotation of £154 reflected no change for the week. London stocks continued their decline, falling 95 tons last week to 28,065 tons.

Lead

Extreme quiet has followed in the wake of the wave of buying a week ago. Consumers are practically wholly covered for March and for about 75 per cent of April needs. Little activity is therefore expected until smelters open their books for May contracting. Despite the comfortable position of producers' books, the leading factors this afternoon reduced their contract bases \$2 a ton to 3.12 1/2c., St. Louis, and 3.25c., New York. This reduction, in addition to reflecting adjustment in sympathy with receding values of other metals, is intended to draw out latent requirements that remain uncovered for March and April. April 1 will mark further drastic retrenchment in lead output. The largest Midwestern producer will cut its production almost in half. This shrinkage will tend, in a large measure, to adjust the existing unbalance between production and consumption, which on March 1 resulted in a further increase of 5100 tons in producers' stocks.

Zinc

Although virtually no demand exists, the price of prime Western is holding firmly at 3.15c. a lb., East St. Louis, and 3.52c., New York. The firmness in price, however, is ascribable chiefly to the tense situation in the Joplin ore field. Ore producers there were asking \$20 a ton on Saturday, with no sales at that figure reported. About 690 tons was sold last week at \$18 for flotation and \$19 for mill grades. Record low ore shipments last week of only 768 tons reflect the reluctance of producers to budge from their determination to limit offerings until higher ore prices can be realized.

Cast Iron Pipe

United States Pipe & Foundry Co. was low bidder on 1200 tons of 8 to 10-in. required by Boston. Bids on this tonnage have been taken three times, United States Pipe & Foundry Co. having been low bidder twice and Warren Foundry & Pipe Co. once.

Newton, Mass., closed bids March 20 on 400 tons of 6 to 12-in.

Chicago is in the market for 1350 tons of 30-in., 1100 tons of 36-in., 7460 tons of 48-in. and 400 tons of large size fittings.

Torrance, Cal., plans about 35 miles of 6 to 16-in. diameter pipe for water supply system. Bond issue of \$400,000 is being arranged.

San Francisco has awarded 1400 tons of 12 and 16-in. to American Cast Iron Pipe Co.

Oakland, Cal. will take bids March 24 on 655 tons of 6- to 8-in.

Menlo Park, Cal., has taken bids on 141 tons of 6- and 10-inch.

The Week's Prices. Cents Per Pound for Early Delivery

	March 15	March 16	March 17	March 18	March 20	March 21
Electrolytic copper, N. Y.*	5.50	5.50	5.25	5.25	5.00	5.00
Lake copper, New York....	5.75	5.75	5.50	5.50	5.25	5.25
Straits tin, Spot, N. Y.....	24.35	24.50	24.35	24.00	23.90
Zinc, East St. Louis.....	3.15	3.15	3.15	3.15	3.15	3.15
Zinc, New York.....	3.52	3.52	3.52	3.52	3.52	3.52
Lead, St. Louis.....	3.22 1/2	3.22 1/2	3.22 1/2	3.22 1/2	3.22 1/2	3.22 1/2
Lead, New York.....	3.35	3.35	3.35	3.35	3.35	3.35

*Refinery quotations price 1/4c. higher delivered in Connecticut.
Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 5.95c. a lb., New York.
Brass ingots, 85-5-5-5, 5.50c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.....	26.00c. to 27.00c.
Tin, bar.....	28.00c. to 30.00c.
Copper, Lake.....	7.50c. to 8.50c.
Copper, electrolytic.....	7.25c. to 8.25c.
Copper, casting.....	7.00c. to 8.00c.
*Copper sheets, hot-rolled.....	13.87 1/2c.
*High brass sheets....	11.25c.
*Seamless brass tubes.....	13.50c.
*Seamless copper tubes.....	12.62 1/2c.
*Brass rods.....	8.75c.
Zinc, slabs.....	4.37 1/2c. to 4.87 1/2c.
Zinc sheets (No. 9), casks.....	9.25c. to 9.50c.
Lead, American pig....	3.75c. to 4.25c.
Lead, bar.....	5.25c. to 6.25c.
Lead, sheets.....	7.00c.
Antimony, Asiatic.....	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus.....	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent.....	16.00c.
Solder, 1/2 and 1/2.....	15.50c. to 16.50c.
Babbitt metal commercial grade.....	21.00c. to 32.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.....	28.25c.
Tin, bar.....	30.25c.

Copper, Lake.....	6.75c.
Copper, electrolytic.....	6.75c.
Copper, casting.....	6.50c.
Zinc, slab.....	4.25c. to 4.50c.
Lead, American pig....	4.00c. to 4.50c.
Lead, bar.....	7.50c.
Antimony, Asiatic.....	8.50c.
Babbitt metal, medium grade.....	16.50c.
Babbitt metal, high grade.....	32.00c.
Solder, 1/2 and 1/2.....	17.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	4.00c.	4.625c.
Copper, hvy. and wire.....	3.75c.	4.50c.
Copper, light and bottoms.....	2.75c.	3.75c.
Brass, heavy.....	1.750c.	2.375c.
Brass, light.....	1.50c.	2.00c.
Hvy. machine composition.....	2.75c.	3.25c.
No. 1 yel. brass turnings.....	2.25c.	2.75c.
No. 1 red brass or compos. turnings....	2.50c.	3.00c.
Lead, heavy.....	2.50c.	2.875c.
Zinc.....	1.50c.	1.75c.
Cast aluminum.....	3.75c.	5.00c.
Sheet aluminum.....	8.50c.	10.00c.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars	
Soft Steel	
Base per Lb.	
Fab. Pittsburgh mill	1.60c.
Fab. Chicago	1.70c.
Del'd Philadelphia	1.90c.
Del'd New York	1.95c.
Del'd Detroit	1.80c.
Fab. Cleveland	1.85c.
Fab. Lackawanna	1.70c.
Fab. Birmingham	1.75c.
C.I.F. Pacific ports	2.10c.

Billet Steel Reinforcing	
(as quoted by distributors)	
Fab. P'gh mills, 40, 50, 60-ft.	1.40c.
Fab. Birmingham, mill lengths	1.65c.
Fab. Cleveland	1.40c.

Roll Steel	
Fab. mills, east of Chicago dist.	1.30c.
Fab. Chicago Heights mills	1.50c.

Iron	
Common iron, f.o.b. Chicago	1.60c.
Medium iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

Tank Plates	
Base per Lb.	
Fab. Pittsburgh mill	1.60c.
Fab. Chicago	1.70c.
Fab. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.8135c.
Del'd Castville	1.85c. to 1.90c.
Fab. Sparrows Point	1.45c. to 1.90c.
Del'd New York	1.645c. to 1.93c.
C.I.F. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.90c.

Structural Shapes	
Base per Lb.	
Fab. Pittsburgh mill	1.60c.
Fab. Chicago	1.70c.
Fab. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.8135c.
Del'd Castville	1.85c. to 1.90c.
Fab. Sparrows Point	1.45c. to 1.90c.
Del'd New York	1.645c. to 1.93c.
C.I.F. Pacific ports	2.00c.
Wrought iron plates, f.o.b. P'gh	3.90c.

Steel Sheet Piling	
Base per Lb.	
Fab. Pittsburgh	1.90c.
Fab. Chicago mill	2.05c.
Fab. Buffalo	2.00c.

Alloy Steel Bars	
(Fab. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)	

Alloy Quantity Bar Base	
2.45c. to 2.65c. per Lb.	
S.A.E. Series	
Numbers	
3000 (1/4% Nickel)	0.25
2100 (1 1/2% Nickel)	0.35
2200 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.35
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.90
3400 Nickel Chromium	3.90
4100 Chromium Molybdenum (0.10 to 0.25 Molybdenum)	0.50
4200 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4300 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.90 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring	0.95
9250 Silicon Manganese Spring	0.25
Steel (flat)	0.50
Rounds and Squares	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is 1/2 c. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the Billet price. Slabs with sectional area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*	
Fab. f.o.b. Pittsburgh mill	1.70c.
Fab. f.o.b. Chicago	1.75c.
Fab. Cleveland	1.75c.
Fab. Buffalo	1.75c.
Fab. Detroit	1.75c.
Fab. eastern Michigan	1.95c.
Shafting, ground, f.o.b. mill	1 1/4 in. 3.00c.
	1-3/16 to 1 1/4 in. 2.50c.
	1-1/16 to 1 1/4 in. 2.35c.
	1-1/16 to 1 1/4 in. 2.20c.
	2-1/16 to 2 in. 2.05c.

* In quantities of 10,000 to 10,999 lb.

SHEETS, STRIP, TIN PLATE

TERNE PLATE	
Sheets	
Hot-Rolled	
No. 10, f.o.b. Pittsburgh	1.40c.
No. 10, f.o.b. Chicago mill	1.50c.
No. 10, del'd Philadelphia	1.71c.
No. 10, f.o.b. Birmingham	1.55c.
No. 10, c.i.f. Pacific Coast ports	2.02 1/2c.

Hot-Rolled Annealed	
No. 10, Pittsburgh	1.55c.
No. 10, Chicago mills	1.65c.
No. 10, Birmingham	1.70c.
No. 10, Pacific Coast ports	2.17 1/2c.
No. 10, wrought iron, Pittsburgh	3.60c.

Hot-Rolled Annealed	
No. 24, f.o.b. Pittsburgh	2.00c.
No. 24, f.o.b. Chicago mills	2.10c.
No. 24, del'd Philadelphia	2.31c.
No. 24, f.o.b. Birmingham	2.15c.
No. 24, c.i.f. Pacific Coast ports	2.65c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled	
No. 10 gage, f.o.b. Pittsburgh	1.90c.
No. 10 gage, f.o.b. Chicago mills	2.00c.
No. 10 gage, del'd Philadelphia	2.21c.
No. 10 gage, del'd Pacific Coast ports	2.52 1/2c.

Light Cold-Rolled	
No. 20 gage, f.o.b. Pittsburgh	2.30c.
No. 20 gage, f.o.b. Chicago mills	2.40c.
No. 20 gage, del'd Philadelphia	2.61c.
No. 20 gage, del'd Pacific Coast ports	2.95c.

Note: Automobile body stock and steel furniture sheets to be quoted henceforth on cold-rolled sheet base prices, with extras for drawing quality.

Galvanized Sheets	
No. 24 f.o.b. Pittsburgh	2.60c.
No. 24 f.o.b. Chicago mills	2.70c.
No. 24, del'd Philadelphia	2.91c.
No. 24, f.o.b. Birmingham	2.75c.
No. 24, c.i.f. Pacific Coast ports	3.25c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Tones	
No. 24, unassorted, 8-lb. coating, f.o.b. Pittsburgh	2.75c.

Vitroous Enameling Stock	
No. 10, f.o.b. Pittsburgh	2.40c. to 2.50c.
No. 20, f.o.b. Pittsburgh	2.90c. to 3.00c.

Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.30c.
No. 28, Chicago mill	2.40c.

Tin Plate	
Base per Box	
Standard cokes, f.o.b. P'gh district mill	\$4.25
Standard cokes, f.o.b. Gary	4.35

Terne Plate	
(F.o.b. Morgantown or Pittsburgh)	
(Per Package, 20 x 25 in.)	
8-lb. coating I.C.	33.70
15-lb. coating I.C.	11.90
20-lb. coating I.C.	13.60
25-lb. coating I.C.	13.80
40-lb. coating I.C.	15.30

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.	
Base per Lb.	
All widths up to 24 in., Pittsburgh	1.45c.
All widths up to 24 in.,	1.55c.
Cooperage stock, P'gh	1.55c. to 1.60c.
Cooperage stock, Chicago	1.65c. to 1.70c.

Cold-Rolled Strips	
Fab. Pittsburgh	1.80c. to 2.00c.
Fab. Cleveland	1.80c. to 2.00c.
Del'd Chicago	2.20c. to 2.30c.
Fab. Worcester	2.00c. to 2.10c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	2.55c. to 2.65c.

WIRE PRODUCTS	
(Carload lots, f.o.b. Pittsburgh and Cleveland.)	
Extras of 10c. a 100 lb. on mixed and joint carloads, 20c. on pool carloads and 30c. on less than carloads are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.	
To Manufacturing Trade	
Bright wire	2.10c.
Spring wire	3.10c.
To Jobbing Trade	
Base per Keg	
Standard wire nails	1.85
Smooth coated nails	1.85
Galvanized nails	3.35
Base per 100 Lb.	
Smooth annealed wire	2.25
Smooth galvanized wire	2.25
Polished staples	2.55
Galvanized staples	2.80
Barbed wire, galvanized	3.35

Woven wire fence No. 9 gage, base column, per net ton.....\$50.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base; Duquoin, Minn., and Worcester, Mass., mill \$2 a ton over Pittsburgh, and Birmingham mill \$3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING	
Welded Pipe	
Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills	
Butt Weld	
Inches Black Galv.	
1/2	51 1/2
3/4	57 3/4
1	62 49 1/2
1 1/4	65 1/2
1 1/2	67 1/2
2	71 1/2
2 1/2	74 1/2
3	77 1/2
3 1/2	80 1/2
4	83 1/2
4 1/2	86 1/2
5	89 1/2
5 1/2	92 1/2
6	95 1/2
6 1/2	98 1/2
7	101 1/2
7 1/2	104 1/2
8	107 1/2
8 1/2	110 1/2
9	113 1/2
9 1/2	116 1/2
10	119 1/2
10 1/2	122 1/2
11	125 1/2
11 1/2	128 1/2
12	131 1/2
12 1/2	134 1/2
13	137 1/2
13 1/2	140 1/2
14	143 1/2
14 1/2	146 1/2
15	149 1/2
15 1/2	152 1/2
16	155 1/2
16 1/2	158 1/2
17	161 1/2
17 1/2	164 1/2
18	167 1/2
18 1/2	170 1/2
19	173 1/2
19 1/2	176 1/2
20	179 1/2
20 1/2	182 1/2
21	185 1/2
21 1/2	188 1/2
22	191 1/2
22 1/2	194 1/2
23	197 1/2
23 1/2	200 1/2
24	203 1/2
24 1/2	206 1/2
25	209 1/2
25 1/2	212 1/2
26	215 1/2
26 1/2	218 1/2
27	221 1/2
27 1/2	224 1/2
28	227 1/2
28 1/2	230 1/2
29	233 1/2
29 1/2	236 1/2
30	239 1/2
30 1/2	242 1/2
31	245 1/2
31 1/2	248 1/2
32	251 1/2
32 1/2	254 1/2
33	257 1/2
33 1/2	260 1/2
34	263 1/2
34 1/2	266 1/2
35	269 1/2
35 1/2	272 1/2
36	275 1/2
36 1/2	278 1/2
37	281 1/2
37 1/2	284 1/2
38	287 1/2
38 1/2	290 1/2
39	293 1/2
39 1/2	296 1/2
40	299 1/2
40 1/2	302 1/2
41	305 1/2
41 1/2	308 1/2
42	311 1/2
42 1/2	314 1/2
43	317 1/2
43 1/2	320 1/2
44	323 1/2
44 1/2	326 1/2
45	329 1/2
45 1/2	332 1/2
46	335 1/2
46 1/2	338 1/2
47	341 1/2
47 1/2	344 1/2
48	347 1/2
48 1/2	350 1/2
49	353 1/2
49 1/2	356 1/2
50	359 1/2
50 1/2	362 1/2
51	365 1/2
51 1/2	368 1/2
52	371 1/2
52 1/2	374 1/2
53	377 1/2
53 1/2	380 1/2
54	383 1/2
54 1/2	386 1/2
55	389 1/2
55 1/2	392 1/2
56	395 1/2
56 1/2	398 1/2
57	401 1/2
57 1/2	404 1/2
58	407 1/2
58 1/2	410 1/2
59	413 1/2
59 1/2	416 1/2
60	419 1/2
60 1/2	422 1/2
61	425 1/2
61 1/2	428 1/2
62	431 1/2
62 1/2	434 1/2
63	437 1/2
63 1/2	440 1/2
64	443 1/2
64 1/2	446 1/2
65	449 1/2
65 1/2	452 1/2
66	455 1/2
66 1/2	458 1/2
67	461 1/2
67 1/2	464 1/2
68	467 1/2
68 1/2	470 1/2
69	473 1/2
69 1/2	476 1/2
70	479 1/2
70 1/2	482 1/2
71	485 1/2
71 1/2	488 1/2
72	491 1/2
72 1/2	494 1/2
73	497 1/2
73 1/2	500 1/2
74	503 1/2
74 1/2	506 1/2
75	509 1/2
75 1/2	512 1/2
76	515 1/2
76 1/2	518 1/2
77	521 1/2
77 1/2	524 1/2
78	527 1/2
78 1/2	530 1/2
79	533 1/2
79 1/2	536 1/2
80	539 1/2
80 1/2	542 1/2
81	545 1/2
81 1/2	548 1/2
82	551 1/2
82 1/2	554 1/2
83	557 1/2
83 1/2	560 1/2
84	563 1/2
84 1/2	566 1/2
85	569 1/2
85 1/2	572 1/2
86	575 1/2
86 1/2	578 1/2
87	581 1/2
87 1/2	584 1/2
88	587 1/2
88 1/2	590 1/2
89	593 1/2
89 1/2	596 1/2
90	599 1/2
90 1/2	602 1/2
91	605 1/2
91 1/2	608 1/2
92	611 1/2
92 1/2	614 1/2
93	617 1/2
93 1/2	620 1/2
94	623 1/2
94 1/2	626 1/2
95	629 1/2
95 1/2	632 1/2
96	635 1/2
96 1/2	638 1/2
97	641 1/2
97 1/2	644 1/2
98	647 1/2
98 1/2	650 1/2
99	653 1/2
99 1/2	656 1/2
100	659 1/2
100 1/2	662 1/2
101	665 1/2
101 1/2	668 1/2
102	671 1/2
102 1/2	674 1/2
103	677 1/2
103 1/2	680 1/2
104	683 1/2
104 1/2	686 1/2
105	689 1/2
105 1/2	692 1/2
106	695 1/2
106 1/2	698 1/2
107	701 1/2
107 1/2	704 1/2
108	707 1/2
108 1/2	710 1/2
109	713 1/2
109 1/2	716 1/2
110	719 1/2
110 1/2	722 1/2
111	725 1/2
111 1/2	728 1/2
112	731 1/2

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No. 2 busheling	\$2.00 to \$2.50
Locomotive tires, smooth	7.50 to 8.50
Pipe and flues	1.25 to 1.75
No. 1 machinery cast	6.25 to 6.75
Clean automobile cast	5.75 to 6.25
No. 1 railroad cast	5.75 to 6.25
No. 1 agricultural cast	5.75 to 6.25
Store plate	5.50 to 6.00
Grate bars	6.25 to 6.75
Brake shoes	6.00 to 6.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$6.50 to \$7.00
No. 2 heavy melting steel	5.00 to 5.50
No. 1 railroad wrought	7.50 to 8.00
Bundled sheets	4.00 to 4.50
Hydraulic compressed, new	5.50 to 6.00
Hydraulic compressed, old	4.00 to 4.50
Machine shop turnings	3.50 to 4.00
Heavy axle turnings	5.50 to 6.00
Cast borings	3.50 to 3.75
Heavy breakable cast	8.00
Store plate (steel works)	5.50 to 6.00
No. 1 low phosph. heavy	10.00 to 10.50
Couplers and knuckles	8.00 to 8.50
Bolled steel wheels	8.00 to 8.50
No. 1 blast furnace	3.50 to 3.75
Spec. iron and steel pipe	6.50 to 7.00
Shafting	12.00 to 13.00
Steel axles	12.00 to 13.00
No. 1 forges	3.50 to 4.00
Cast iron car wheels	8.00 to 8.50
No. 1 cast	8.00 to 9.00
Cast borings (chem.)	8.00 to 10.00
Steel rails for rolling	9.00 to 9.50

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	6.25 to 6.50
Compressed steel	6.00 to 6.50
Light bundled sheet stampings	4.00 to 4.50
Drop forge flashings	5.25 to 5.75
Machine shop turnings	3.50 to 3.75
Short shoveling turnings	3.75 to 4.25
No. 1 busheling	5.25 to 5.50
Steel axle turnings	5.00 to 5.50
Low phosph. billet crops	10.00 to 11.00
Cast iron borings	3.75 to 4.25
Mixed borings and short turnings	3.75 to 4.25
No. 2 busheling	4.50 to 4.75
No. 1 cast	7.00 to 7.50
Railroad grate bars	5.00 to 5.50
Store plate	5.00 to 5.50
Balls under 3 ft.	8.50 to 9.00
Balls for rolling	8.50 to 9.00
Railroad malleable	6.75 to 7.00
Cast iron car wheels	8.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' yards:	
No. 1 heavy melting steel	\$7.00 to \$7.25
No. 2 heavy melting steel	5.50 to 6.00
Scrap rails	6.00 to 6.50
New hydraulic comp. sheets	5.50 to 6.00
Old hydraulic comp. sheets	5.00
Drop forge flashings	5.50 to 6.00
No. 1 busheling	5.50 to 6.00
Hyv. steel axle turnings	6.00
Machine shop turnings	4.00 to 4.50
Knuckles and couplers	9.00
Coll and leaf springs	9.00
Bolled steel wheels	9.00
Low phosph. billet crops	9.00 to 9.50
Short shov. steel turnings	5.50 to 6.00
Short mixed borings and turnings	3.75 to 4.25
Cast iron borings	3.75 to 4.25
No. 3 busheling	3.50 to 4.00
Steel axle axles	10.00 to 11.00
Iron axles	10.00 to 11.00
No. 1 machinery cast	3.50 to 4.00
No. 1 cupola cast	3.50 to 4.00
Store plate	7.00 to 7.50
Steel rails, 3 ft. and under	8.50 to 9.00
Cast iron car wheels	8.00 to 9.00
Industrial malleable	7.00 to 7.50
Railroad malleable	7.00 to 7.50
Chemical borings	7.50 to 8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$7.00 to \$7.50
Scrap steel rails	7.00 to 7.50
Short shoveling turnings	4.00
Store plate	6.00
Steel axles	9.00
Iron axles	9.00
No. 1 railroad wrought	4.50 to 5.00
Rails for rolling	4.50 to 5.00
No. 1 cast	8.00
Tramcar wheels	8.00
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$5.50 to \$6.00
No. 1 heavy melting	4.50 to 5.00
No. 2 heavy melting	4.75 to 5.25
No. 1 locomotive tires	5.00 to 5.50
Mixed stand-sec. rails	5.50 to 6.00
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	5.00 to 5.50
No. 1 busheling	3.50 to 4.00
Cast iron borings and shoveling turnings	2.75 to 3.25
Rails for rolling	6.75 to 7.25
Machine shop turnings	2.00 to 2.50
Heavy turnings	3.00 to 3.50
Steel car axles	8.50 to 9.00
Iron car axles	11.00 to 11.50
Wrought iron bars and trans.	4.00 to 4.50
No. 1 railroad wrought	3.50 to 4.00
Steel rails less than 3 ft.	7.00 to 7.50
Steel angle bars	6.00 to 6.50
Cast iron car wheels	5.00 to 5.50
No. 1 machinery cast	6.50 to 7.00
Railroad malleable	4.00 to 4.50
No. 1 railroad cast	6.25 to 6.75
Store plate	9.00 to 9.50
Relay rails, 60 lb. and under	16.00 to 16.50

Relay rails, 60 lb. and over	\$20.00 to \$21.00
Agricult. malleable	4.00 to 4.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$3.00 to \$3.25
Scrap T rails	2.50 to 2.75
Machine shop turnings	0.80 to 1.00
Cast iron borings	1.00 to 1.25
Rundled skeleton, long	2.00 to 2.10
Forge flashings	3.00 to 3.50
Blast furnace scrap	0.90 to 1.00
Forge scrap	3.00 to 3.25
Shafting	9.50 to 10.00
Steel car axles	9.00 to 9.50
Wrought pipe	4.00 to 4.25
Rails for rolling	4.50 to 5.00
Cast iron borings, chemical	7.00 to 7.25
Per gross ton delivered consumers' yards:	
Textile cast	\$7.00 to \$7.50
No. 1 machinery cast	7.50 to 8.00
Store plate	5.00 to 5.25
Railroad malleable	8.00 to 8.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$3.50 to \$5.00
No. 2 heavy melting steel	3.50 to 4.00
Heavy melting steel (yard)	1.50
No. 1 heavy breakable cast	5.00 to 5.25
Store plate (steel works)	2.50 to 2.90
Machine shop turnings	1.25 to 1.25
Short shoveling turnings	0.75 to 1.25
Cast borings	0.50 to 1.00
No. 1 blast furnace	0.50 to 1.00
Steel car axles	8.00 to 8.50

Warehouse Prices for Steel Products

PITTSBURGH

Base per lb.	
Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.60c
Reinforcing steel bars	2.60c
Cold-finished and screw stock—	
Rounds and hexagons	2.95c
Squares and flats	3.45c
Hoops and bands, under 1 1/2 in.	2.95c
Hot-rolled annealed sheets (No. 24)	3.10c
25 or more bundles	3.10c
Galv. sheets (No. 24), 25 or more	3.35c
Hot-rolled sheets (No. 10)	2.65c
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	\$3.61
Spikes, large	2.40c
Small	2.65c
Boat	2.90c
Track bolts, all sizes, per 100 count, 70 per cent off list.	
Machine bolts, 100 count, 70 per cent off list.	
Carriage bolts, 100 count, 70 per cent off list.	
Nuts, all styles, 100 count, 70 per cent off list.	
Large rivets, base per 100 lb.	\$3.60
Wire, black, soft ann'd, base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	3.10
Common wire nails, per keg	2.20
Cement coated nails, per keg	2.20
On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.	

CHICAGO

Base per lb.	
Plates and structural shapes	3.00c
Soft steel bars	2.75c
Reinforce. bars, billet steel	1.75c
Rail steel reinforcement	1.30c to 1.45c
Cold-fin. steel bars and shafting	3.00c
Rounds and hexagons	3.50c
Plates and squares	3.50c
Bands, 3/16 in. (in Nos. 10 and 12 gauges)	2.95c
Hoops (No. 14 max and lighter)	3.50c
Hot-rolled annealed sheets (No. 24)	3.45c
Galv. sheets (No. 24)	3.50c
Hot-rolled sheets (No. 10)	2.90c
Spikes (3/16 in. and lighter)	3.45c
Track bolts	4.50c
Rivets, structural (keg lots)	2.75c
Rivets, boiler (keg lots)	2.75c
Per Cent Off List	
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq. tap. or blank	65
Hot-pressed nuts, hex. tap. or blank	65
Hex. head cap screws	80 and 10
Cup point set screws	75
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Stove bolts	65
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	\$4.50 off list
No. 8 black ann'd wire, per 100 lb.	\$3.45
Com. wire nails, base per keg	2.30
Cement c'd nails, base per keg	2.30

NEW YORK

Base per lb.	
Plates and struc. shapes	3.10c
Soft steel bars, small shapes	3.10c
Iron bars	3.24c
Iron bars, Swed. charcoal	5.90c to 6.25c
Cold-fin. shafting and screw stock	
Rounds and hexagons	3.54c
Flats and squares	4.94c
Cold-rolled strip, soft and quarter hard	4.95c
Hoops	3.30c
Bands	3.30c
Hot-rolled sheets (No. 10)	2.75c
Hot-rolled ann'd sheets (No. 24)	3.25c
Galvanized sheets (No. 24)	3.50c
Long term sheets (No. 24)	4.50c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.05c
Tire steel 1/2 x 1/2 in. and larger	3.40c
Smooth finish, 1 to 2 1/2 x 1/4 in. and larger	3.75c

Spec. iron and steel pipe	\$2.50 to \$2.75
Forge fire	2.75 to 3.00
No. 1 railroad wrought	4.00 to 4.50
No. 1 yard wrought long	3.25 to 3.50
Rails for rolling	5.00 to 5.50
No. 2 cast	4.50
Stove plate (foundry)	4.50
Malleable cast (railroad)	4.00 to 4.50
Cast borings (chemical)	6.00 to 6.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$9.00
No. 1 hyv. cast (cupola size)	7.50 to 8.00
No. 2 cast	4.00 to 4.50

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$5.25 to \$5.75
Loose sheet clippings	6.00 to 6.50
Bundled sheets	3.75 to 4.25
Cast iron borings	3.00 to 3.50
Machine shop turnings	3.00 to 3.50
No. 1 busheling	4.50 to 5.00
No. 2 busheling	2.75 to 3.25
Rails for rolling	4.50 to 5.00
No. 1 locomotive tires	7.00 to 7.50
Short rails	9.00 to 9.50
Cast iron car wheels	6.50 to 7.00
No. 1 machinery cast	6.50 to 7.00
No. 1 railroad cast	6.00 to 6.50
Burnt cast	4.25 to 4.75
Store plate	4.25 to 4.75
Agricultural malleable	6.75 to 7.25
Railroad malleable	7.00 to 7.50

DETROIT

Dealers' buying prices per gross ton:	
Hyv. melting steel	\$4.50 to \$5.00
Borings and short turnings	2.50 to 3.00
Long turnings	2.25 to 2.75
No. 1 machinery cast	8.00 to 8.50
Automotive cast	8.00 to 8.50
Hydraulic comp. sheets	4.25 to 4.75
Stove plate	3.00 to 3.50
New No. 1 busheling	3.75 to 4.25
Old No. 2 busheling	1.50 to 2.00
Sheet clippings	1.25 to 1.75
Flashings	2.75 to 3.25

CANADA

Dealers' buying prices per gross ton:	
	Toronto Montreal
Heavy melting steel	\$7.00 \$6.00
Rails, scrap	7.00 6.00
No. 1 wrought	6.00 8.00
Machine shop turnings	2.00 2.00
Boiler plate	5.00 4.50
Heavy axle turnings	2.50 2.50
Cast borings	2.00 2.00
Steel borings	2.00 2.00
Wrought pipe	2.00 2.00
Steel axles	7.00 9.00
Axles, wrought iron	7.00 11.00
No. 1 machinery cast	12.50 10.00
Stove plate	10.00 8.00
Standard car wheels	10.00 8.50
Malleable	10.00 8.00

Open hearth spring steel, base	4.50c to 7.00c
Common wire nails, base, per keg	\$2.80
Per Cent Off List	
Machine bolt, cut thread:	
1/2 x 8 in. and smaller	.65 to .85 and 10
1 x 30 in. and smaller	.65 to .85 and 10
Carriage bolts, cut thread:	
1/2 x 6 in. and smaller	.65 to .85 and 10
3/4 x 20 in. and smaller	.65 to .85 and 10
Boiler tubes:	
Lap welded, 2-in.	\$13.05
Seamless welded, 3-in.	19.24
Charcoal iron, 4-in.	24.84
Charcoal iron, 4-in.	63.65
* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.	

ST. LOUIS

Base per lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
Cold-fin. rounds, shafting, screw stock	3.30c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.00c
Hot-rolled sheets (No. 10) up to and under 48 in. wide	3.00c
over 48 in. wide	3.15c
Black corrug. sheets (No. 24)	3.75c
Galv. corrug. sheets	4.05c
Structural rivets	4.00c
Boiler rivets	4.00c
Tank rivets, 7/16 in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, blank or tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex., blank or tapped, 60 lb. or more	65
Less than 200 lb.	55

PHILADELPHIA

Base per lb.	
*Plates, 1/4-in. and heavier	2.45c
*Structural shapes	2.45c
*Soft steel bars, small shapes, iron bars (except bands)	2.45c
Reinforce. steel bars, sq. twisted and deform.	2.90c
Cold-finished steel bars	3.35c
*Steel hoops	3.00c
*Steel bands, No. 12 to 3/16 in. incl.	2.75c
*Sizing steel	3.00c
*Hot-rolled annealed sheets (No. 24)	3.15c
*Galvanized sheets (No. 24)	3.50c
*Hot-rolled annealed sheets (No. 10)	2.70c
Diam. nat. floor plates, 1/4 in.	5.00c
Swedish iron bars	6.00c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deductions on orders aggregating 1000 lb. or over.
†For 50 bundles or over.

CLEVELAND

Base per lb.	
Plates and struc. shapes	2.95c
Soft steel bars	2.75c
Reinforce. steel bars	1.75c to 2.95c
Cold-fin. steel bars	2.95c
Flat rolled steel under 1/2 in.	3.00c
Cold-finished strip	5.55c
Hot-rolled annealed sheets (No. 24)	3.25c
Galvanized sheets (No. 24)	3.50c
Hot-rolled sheets (No. 10)	3.00c
Black ann'd wire, per 100 lb.	\$2.35
No. 9 galv. wire, per 100 lb.	2.30
Com. wire nails, base per keg	2.10

*Net base, including boxing and cutting to length.

CINCINNATI

Base per lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
New billet reinforce. bars	3.00c
Rail steel reinforce. bars	3.00c
Hoops	3.00c

Base per lb.	
Plates and struc. shapes	3.20c
Soft steel bars	3.50c
Reinforcing bars	3.50c
Cold-fin. flats and sq. stock	3.50c
Rounds and hex.	3.00c
Cold-rolled strip steel	5.25c
Hot-rolled annealed sheets (No. 24)	3.70c
Galv. sheets (No. 24)	4.05c
Bands	3.95c
Hoops	3.45c
Hot-rolled sheets (No. 10)	3.45c
Com. wire nails, base per keg	\$2.80
Black wire, base per 100 lb.	3.25

BUFFALO

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Fidelio Brewery, Inc., 495-513 First Avenue, New York, plans installation of new bottling and other equipment, in connection with plant expansion and modernization now under way. Cost over \$65,000. Joseph D. Weiss, 119 West Fifty-seventh Street, is architect.

Wilkroth, Inc., New York, has been organized by William K. Roth, 3242 Thirty-third Street, Astoria, L. I., and associates, capital \$75,000, to manufacture metal products.

Fritz Boeschel, New York, has leased floor in building at 314 West Fourteenth Street for new machine works, with department for manufacture of mechanical parts for radio and other service.

New Amsterdam Brewing Co., 10 East Fortieth Street, New York, Herbert L. Noll, president, is considering new plant at Rochester, N. Y. Cost close to \$200,000 with machinery. Another brewery is projected at Cincinnati, to cost about like sum. Company was organized recently and is beginning work on main plant at Middle Village, Queens Borough, N. Y., to cost about \$2,000,000 with equipment. Badgley & Wood, 101 Park Avenue, New York, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 28 for one motor-driven rotary shear (Schedule 9797) for Brooklyn Navy Yard.

Centrifilter Corp., New York, has been organized by Walter T. McIntosh, 15 Park Street, Tenafly, N. J., and associates, to manufacture filters and other mechanical equipment.

Philip Bardes, 230 Grand Street, New York, architect, has plans for a one-story repair and forge shop, 50 x 72 ft., at 452 West 167th Street; owner's name temporarily withheld. Cost about \$24,000 with equipment.

Wecoline Products, Inc., 15 East Twenty-sixth Street, New York, manufacturer of oil products, has leased one and two-story and basement factory, 40 x 120 ft., at Boonton, N. J., for new plant. Cost over \$30,000 with equipment. J. K. Cooke & Son, Inc., 210 Clifton Boulevard, Clifton, N. J., is consulting engineer.

Lehigh & Wilkes-Barre Coal Co., Hampton, N. J., plans rebuilding of coal breaker, recently damaged by fire. Loss over \$40,000 with equipment.

Foster Gas Appliance Co., Newark, care of M. J. Tackella, 95 River Street, Hoboken, N. J., representative, has been organized by George and John Foster, Brooklyn, N. Y., to manufacture gas-burning equipment and appliances for boilers.

Gold Seal Mfg. Co., 5 Central Avenue, East Newark, N. J., manufacturer of radio tubes and equipment, plans one-story branch factory at Hull, Que. Cost over \$40,000 with machinery.

Supply Officer, Naval Aircraft Factory, Navy Yard, Philadelphia, asks bids until March 27 for ring and plug thread gages (Aero Req. 980), two gear boxes and five tachometers (S. & A. Req. 5116), also 3528 ft. copper tubing (Aero Req. 967).

Thomas Devlin Mfg. Co., Twenty-second Street and Sedgley Avenue, Philadelphia, manufacturer of plumbing equipment and supplies, pipe fittings, etc., will carry out plant modernization and improvements at Burlington, N. J., including equipment.

Fable & Co., Inc., 510 North Third Street, Philadelphia, manufacturer of sheet metal products, has leased space in building at 829 North Leithgow Street for new plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 28 for one motor-driven boring, drilling and milling machine (Schedule 9769), three transformers, each 500-kva. capacity (Schedule 9792) for Philadelphia Navy Yard.

Pep Boys Auto Supply Co., Inc., Broad and Vine Streets, Philadelphia, automobile equipment and supplies, has asked bids on general contract for three-story storage and distributing plant. Cost over \$125,000 with equipment. Thalheimer & Weitz, 10 South Eighteenth Street, are architects.

Alden Coal Co., Alden, near Wilkes-Barre, Pa., plans rebuilding portion of coal washery at mining properties at Alden, recently

destroyed by fire. Loss about \$40,000 with equipment.

Cataract Consumers' Brewery, Tenth Street, Niagara Falls, N. Y., has approved plans for extensions and improvements including additional equipment. Cost about \$60,000. James W. Canavan, Sr., is head.

S. B. Roby Co., 208-14 South Avenue, Rochester, N. Y., iron and steel products, mill supplies, etc., plans rebuilding storage and distributing plant, recently destroyed by fire. Loss over \$100,000 with equipment.

Capstaff Marine Turbine Co., Hoboken, N. J., has taken over a larger plant at Thirtieth and Grand Streets and installed additional machinery for repair and manufacture of turbines. J. Capstaff heads company.

◀ NEW ENGLAND ▶

Mexican Petroleum Corp., Bridgeport, Conn., plans extensions in bulk oil storage and distributing plant, including tanks and other equipment. Headquarters are 122 East Forty-second Street, New York.

Draper Corp., Hopedale, Mass., manufacturer of textile machinery and parts, has let general contract to Casper Ranger Construction Co., Holyoke, Mass., for extensions and improvements in erecting shop. F. P. Sheldon & Son, Hospital Trust Building, Providence, R. I., are architects.

Linden & Co., Inc., Providence, R. I., has been organized by Carl E. P. Linden and George F. Berkander, 65 Adelaide Avenue, to manufacture machinery and parts.

Connecticut Hydrogas Corp., Portland, Conn., will soon resume erection of non-polluting gasoline-manufacturing plant, on which work was discontinued several months ago. Proposed to complete project late in summer, including bulk oil storage and distributing facilities. Cost close to \$100,000 with equipment. S. Francis Farkas, Jr., Fairfield, Conn., is vice-president.

Alba Metal Products Co., Worcester, Mass., has been organized by J. Henry Perry and George F. Doran, 266 Chandler Street, to manufacture metal goods.

◀ MIDDLE WEST ▶

Grunow Corp., 4127 George Street, Chicago, William C. Grunow, head, recently organized to manufacture electric refrigerators and parts, will establish initial plant at works of Briggs Mfg. Co., Detroit, for production of metal cabinets and assembling refrigerating units.

City Council, Heyworth, Ill., has been authorized to erect a new municipal electric light and power plant to cost \$62,000 with equipment. Warren & Van Praag, Decatur, Ill., are consulting engineers. Board of Local Improvements, E. O. Washburn, president, in charge.

Backemeyer Coal Co., Carlyle, Ill., is planning to rebuild tippie at properties near Carlyle, recently destroyed by fire. Loss about \$22,000 with machinery.

United States Engineer Office, Duluth, Minn., asks bids until March 27 for one horizontal two-cylinder non-reversing steam dinner dredge hoisting engine, with intermediate gear and accessories (Circular 40).

Sheridan Brewing Co., Sheridan, Wyo., is planning extensions and improvements, including additional equipment, bottling machinery, etc. Fund of \$50,000 has been arranged. Henry Kroger is president.

A. B. Dick Co., 720 West Jackson Boulevard, Chicago, manufacturer of mimeograph and duplicating machines and parts, will establish branch plant at Toronto, Ont., to be operated by Mimeograph Co., Ltd., a subsidiary.

Water Department, Elmhurst, Ill., plans installation of pumping machinery and other equipment for extensions in water supply system and new water softening plant. Cost \$140,000. Consoer, Older & Quinlan, 205 West Wacker Drive, Chicago, are consulting engineers.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until March 28 for 1600 cranks, 3150 plugs,

testing cabinets and other supplies (Circular 32).

Gar-Worth Mfg. Co., Kaukauna, Wis., has been incorporated with initial capital of \$10,000 to manufacture machine shop equipment and mechanical specialties. Production plans have not been announced. Principals are Chester Garrity, 927 Grignon Street; G. R. Charlesworth, 611 West Wisconsin Avenue, and Joseph Conrad, 273 Taylor Street, all of Kaukauna.

R. E. Stoelting, Commissioner of Public Works, City Hall, Milwaukee, will ask bids soon for pumping equipment costing about \$30,000 for municipal water department's new booster station on South Forty-fourth Street.

Christian Garschke, 2735 South Austin Street, Milwaukee, has leased space at 828 South Water Street for a brass and aluminum foundry.

◀ CENTRAL DISTRICT ▶

Pittsburgh Brewing Co., 3340 Liberty Avenue, Pittsburgh, will make extensions and improvements in plant, including additional equipment. Cost over \$70,000.

Greensburg Baking Co., Greensburg, Pa., plans installation of traveling ovens, mixing, conveying and other equipment in connection with rebuilding plant recently destroyed by fire. Cost over \$100,000. McCormick Co., Inc., 121 South Negley Avenue, Pittsburgh, is architect and engineer.

Milan Securities Co., Milan, Ohio, recently organized by James Kelly and associates, has taken over plant of Joseph Herb Brewing Co., and plans expansion and modernization program, including machinery. Cost over \$65,000.

Construction Quartermaster, Patterson Field, Fairfield, Ohio, has plans for new steam power plant for central heating. Cost about \$150,000 with equipment.

Industrial Rayon Corp., Cleveland, manufacturer of cellulose rayon products, has plans for additions to branch mill at Covington, Va., three stories, 45 x 57 ft., one story, 105 x 220 ft., and two one-story units, 25 x 30 ft. Cost close to \$100,000 with equipment. Christian, Schwarzenberg & Gaede Co., Cleveland, is architect. Company has work under way on addition to Cleveland plant and contemplates further expansion with new two-story unit, 40 x 116 ft., for which plans are under way.

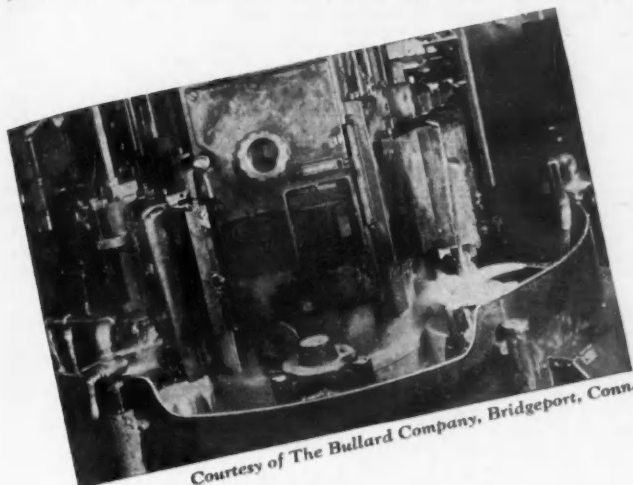
Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until March 27 for one portable electric arc welder (Circular 472), six counterweights, 24 bushings, screws, lugs, etc. (Circular 464); until March 28, 355,000 steel plain washers and 700,000 brass plain washers (Circular 468); until March 29, 400 fuel cock assemblies (Circular 450), 68,600 flat head pins (Circular 470); until April 3, 12 grinders, 15 combination grinders and buffers, two polishing and buffing lathes, one combination grinding and reaming machine, all motor driven (Circular 458), six roller assemblies, 14 bearing assemblies, etc. (Circular 475), 200 compass assemblies (Circular 463).

Simrall Refining Co., Union Central Building, Cincinnati, is planning addition to oil refinery at Amherstburg, Ont., operated by Simrall Refining Corp. of Canada, Ltd., a subsidiary. Cost over \$150,000 with equipment. G. C. Wade is company engineer.

Petersburg Water Co., Petersburg, Ind., plans installation of pumping machinery and other equipment in connection with extensions and improvements in waterworks. Cost about \$70,000. Charles H. Hurd, Architects and Builders Building, Indianapolis, is consulting engineer.

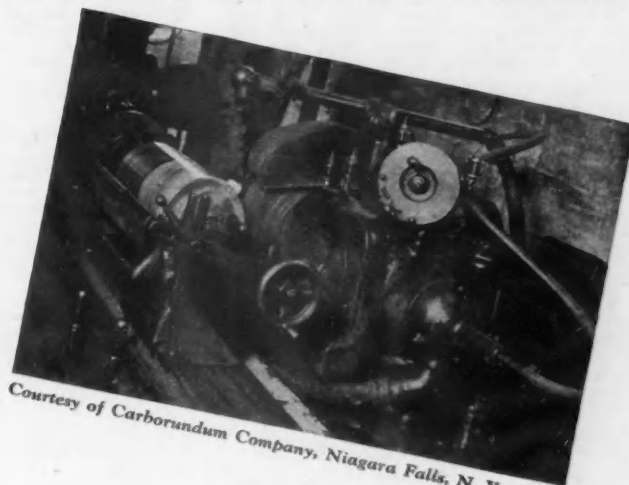
Atlas Mfg. Co., Inc., Indianapolis, has been organized by E. M. Gass, 5410 Washington Boulevard, and associates, to manufacture automotive and mechanical equipment.

Rudy Furnace Co., Dowagiac, Mich., has purchased plant and business of Betts & Cole Heater Co., Marshall, Mich., manufacturer of hot water heaters, incinerators and kindred heating equipment. Marshall plant will be removed to Dowagiac, where capacity will be increased. Everett D. Betts, head of acquired



Courtesy of The Bullard Company, Bridgeport, Conn.

OPERATION: TURNING COMPANION FLANGE.
MACHINE: BULLARD MULTI-AU-MATIC.
MATERIAL: STEEL FORGING.
SPEED: 78 FEET PER MINUTE.
DEPTH OF CUT: 3/16 INCH.
FEED: .018 INCH.
LUBRICANT: 1 PART SUNOCO TO 20 PARTS WATER.



Courtesy of Carborundum Company, Niagara Falls, N. Y.

OPERATION: GRINDING STEEL ROLL.
 9 IN. DIAMETER, 18 IN. LONG.
MACHINE: LANDIS ROLL GRINDER, 12 IN. X 72 IN.
SCLEROSCOPE: 94 TO 101.
WHEEL SPEED: 1700 R. P. M.
WORK SPEED: 40 R. P. M.
COOLANT: 1 PART SUNOCO TO 30 PARTS WATER.

ACCURACY MAINTAINED *with* LONG RUNS BETWEEN TOOL GRINDS

The increasing necessity for lower production costs places upon Machine Shop Executives the obligation of selecting cutting lubricants of known quality and proven worth.

Economical operation and profit are dependent upon continuous machine tool performance.

The service that Sunoco Emulsifying Cutting Oil renders many leaders in the metal cutting industry in reducing the cost of production is at your disposal for operations in your plant.

Increased machine speed, longer runs per tool grind, less lost time for resetting, reduced tool maintenance, greater accuracy and better finish are the reasons for the increasing use of Sunoco by the automotive industry, nut and bolt industry, gear manufacturers and steel plants.

Sunoco protects the finished work from rust and corrosion, it will not separate and is hygienic.

We invite your correspondence and cordially offer you the assistance of our experienced Cutting Oil Engineers.

SUN OIL COMPANY, PHILADELPHIA, PA., U.S.A.

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BRITISH SUN OIL COMPANY, LTD., London, England.

SUNOCO

EMULSIFYING

CUTTING OIL

Made by the producers of BLUE SUNOCO MOTOR FUEL

Akron, Albany, Allentown, Altantic City, Baltimore, Battle Creek, Beaumont, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Dayton, Detroit, Flint, Grand Rapids, Harrisburg, Jackson (Mich.), Jacksonville, Miami, Montreal, Newark, New York, Philadelphia, Pittsburgh, Providence, Reading, Rochester, Scranton-Wilkes Barre, Syracuse, Tampa, Toledo, Toronto, Trenton, Tulsa, Wilmington, Youngstown and London, England.

company, will become connected with Rudy company.

Monitor Sugar Co., Bay City, Mich., is planning installation of unloading machinery and other mechanical-handling equipment at beet sugar mill at Mount Clemens, Mich., recently leased from Mount Clemens Operating Co.

General Beverage Equipment Corp., Detroit, has been organized by Robert June, 1603 Longfellow Avenue, and associates, to manufacture machinery for brewing and beverage plants.

Board of Public Works, Saginaw, Mich., plans installation of pumping machinery and other equipment in new municipal sewage disposal plant, and in new waterworks filtration plant. Entire project will cost over \$2,700,000. Hoad, Decker, Shoecraft & Drury, Ann Arbor, Mich., are consulting engineers.

Michigan Public Service Co., Ludington, Mich., is planning extensions and improvements in transmission and distributing lines at Whitehall, Mich. Cost about \$35,000 with equipment.

◀ SOUTHWEST ▶

Phillips Petroleum Co., Bartlesville, Okla., is considering addition to gasoline refinery at Oklahoma City. Cost over \$30,000 with equipment. A. H. Riney is company engineer.

City Council, Paragould, Ark., is disposing of a bond issue of \$100,000, fund to be used for a municipal electric light and power plant and distributing system. Entire project will cost \$175,000. W. A. Fuller Co., 2916 Shenandoah Avenue, St. Louis, is consulting engineer.

Continental Oil Co., Ponca City, Okla., has begun expansion and improvement program at oil refinery at North Wichita Falls, Tex. Cost about \$40,000 with equipment.

Duroflex Piston Mfg. Co., 3215 Berwin Street, Dallas, Tex., has purchased property at Houston, Tex., for erection of new one-story plant and will remove to new location. Cost over \$25,000 with equipment.

Golden Petroleum Co., Hatchel, Tex., has approved plans for new oil refinery about one mile from city. Cost over \$90,000 with machinery.

Mistletoe Creameries, Inc., San Antonio, Tex., plans installation of tanks, conveyors, power and mechanical equipment in new milk products plant. Cost about \$100,000 with machinery. Atlee B. and Robert M. Ayres Smith-Young Tower Building, are architects.

◀ SOUTH ATLANTIC ▶

Chemical Warfare Service, Edgewood Arsenal, Md., asks bids until March 27 for 75 flanged steel cylinders (Circular 47).

General Purchasing Officer, Panama Canal, Washington, will receive bids until March 29 for track system for 35-ton locomotive crane, including switchstand, etc.; 100 33-in. car wheels, gate valves, cocks, 125 transformers, cable, etc. (Schedule 2851); until March 31, locomotive tender wheels, steel tubing, wire rope, chain hoists, band saws, steel, iron, bronze, zinc, copper and brass pipe, soft steel wire, nails, etc. (Schedule 2850).

Pure Oil Co., Augusta, Ga., with headquarters at 35 East Wacker Drive, Chicago, is considering bulk oil storage and distributing plant at New Savannah Bluff, about 15 miles from Augusta. Cost over \$85,000 with equipment.

Division of Purchases and Sales, Department of Commerce, Washington, asks bids until March 28 for 126,000 lin. ft. steel tape armored cable (Proposal 25153); until March 30, ten box-type compasses (Proposal 25163).

Tampa Shipbuilding Co., Tampa, Fla., operating former Oscar Daniels Shipyard, plans rebuilding portion of plant recently destroyed by fire. Loss over \$100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until May 3 for two-story mechanical building at navy yard, Pearl Harbor, T. H., including a two-ton crane, electrical system, steel windows, steel doors, etc. (Specification 7074).

Bergeon-Mitchell, Inc., West Palm Beach, Fla., has been organized by Paul Bergeon and J. A. Mitchell, West Palm Beach, to manufacture iron and steel products.

Superintendent, Federal Correction Camp, Fort Eustis, Va., asks bids until March 27 for one steam turbine-driven generating unit,

including exciter and accessories (Circular 133).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 28 for one 5-ton gasoline power roller (Schedule 9779) for Sewall's Point, Va.; Navy Yard; 35,000 steel sheets, 51,000 lb. flat steel and 36,000 lb. galvanized steel (Schedule 9742) for Norfolk and Mare Island yards; until April 4, two 35-ton switching locomotives and one set spare parts (Schedule 9790) for Lualaba and West Loch, T. H., naval stations; two motor-driven circulating pumps (Schedule 9794) for Sewall's Point yard; compressed oxygen gas (Schedule 9774), carbon dioxide gas (Schedule 9773) for Eastern and Western yards; one 15-ton locomotive crane and spare parts, and one 15-ton crawler type crane and spare parts (Schedule 9785) for Pearl Harbor, T. H., yard.

◀ SOUTH CENTRAL ▶

Aetna Oil Service Co., Louisville, plans new bulk oil storage and distributing plant at Lexington, Ky. Cost over \$25,000 with equipment. J. R. Price is company engineer.

Louisville Water Co., Louisville, plans installation of 100 and 200-kw. turbo-generators and auxiliary power equipment, in connection with extensions and improvements in waterworks. John Chambers is company engineer.

Common Council, Heflin, Ala., plans installation of pumping machinery and other equipment for new municipal waterworks. J. B. McCrary Co., Atlanta, Ga., is consulting engineer.

Common Council, Middlesboro, Ky., is arranging sale of \$300,000 bond issue, fund to be used for municipal electric light and power plant and equipment.

Town Council, Flemingsburg, Ky., plans installation of pumping machinery and other equipment for new municipal waterworks. Fund of \$75,000 being arranged.

Heidelberg Brewing Co., Covington, Ky., recently organized, is taking over property at Fourth and Bakewell Streets for new brewing plant. Cost over \$85,000. Company is capitalized at \$350,000 and headed by George H. Meyerratken, president of Quaker Mfg. Co., Covington, manufacturer of furniture.

◀ PACIFIC COAST ▶

City Council, Montebello, Cal., asks bids until March 27 for a municipal electric light and power plant, including two Diesel engines and generators and other equipment. John Cole is city engineer in charge.

Salinas Brewing Co., Salinas, Cal., William Voss, president, is planning extensions and modernization program, including additional equipment. Cost over \$60,000 with machinery.

Golden Bear Oil Co., 325 West Eighth Street, Los Angeles, has plans for a new bulk oil storage and distributing plant near King City, Cal. Cost close to \$30,000 with tanks and other equipment.

Goldkist Packing Co., Fresno, Cal., is planning to rebuild fruit packing plant, recently destroyed by fire. Loss about \$45,000 with conveyors, loaders and other equipment.

Walla Walla Canning Co., Walla Walla, Wash., has plans for new one-story fruit canning plant, 60 x 220 ft. Cost about \$45,000 with equipment. Company also plans one-story storage and distributing unit, 60 x 140 ft. Cost about \$25,000 with equipment.

Water Department, Lewiston, Idaho, is arranging fund of about \$26,700 for purchase of pumping machinery and filtration plant equipment, in connection with waterworks expansion and improvement program.

Brewery Engineering Corp., Seattle, recently organized by Walter Metsenbaum, 816 Second Avenue, and associates, is considering erection of new plant at Cle Elum, Wash. Cost about \$85,000 with equipment.

Amalgamated Sugar Co., Steele Building, Denver, affiliated with American Beet Sugar Co., same address, is considering extensions and improvements in beet sugar mill at Twin Falls, Idaho. Cost about \$40,000 with equipment. A similar program is contemplated at mill at Burley, Idaho, costing close to like amount. R. H. Cottrell, company mill, Ogden, Utah, is general superintendent.

City Council, Torrance, Cal., plans installation of elevated steel tank, 250,000-gal. capacity on 150 ft. tower, in connection with extensions and improvements in municipal water system. A fund of \$400,000 is being arranged for entire program.

◀ FOREIGN ▶

Bureau of Railways, Ministry of Public Works, Government of Rome, Italy, has arranged fund of about 1,200,000,000 lire (approximately \$60,000,000) for railroad electrification during next 48 months, including main lines from Milan to Reggio-Calabria, from Turin to Trieste, main lines through Milan connecting with Genoa, line from Liguria to Piedmontese, from Bologna to Florence, and other lines.

Graphitwerke Kropfmühl, A.G., Munich, Germany, manufacturer of graphite products, has arranged for increase in capital from 700,000 to 1,000,000 m. (about \$168,000 to \$240,000), part of fund to be used for expansion, including acquisition of Deutsche Graphitwerke, G.m.b.H., Dohna, near Dresden, and other graphite properties.

French Superior Railway Council, Paris, France, has approved fund of about \$19,500,000 for purchase of new equipment and rolling stock, including 71 steam locomotives, tenders, cars, etc.

Industrial Finance

Youngstown Sheet & Tube Co., in its pamphlet report for 1932, states that its operations last year averaged only 13.4 per cent of capacity, which was considerably below the average for the entire steel industry. The company was particularly hard hit by the fact that the oil, gas and building industries, which it principally serves, were at such a low level. The report states that the management has been giving careful study to diversifying the company's products. As conditions warrant, the company hopes "to put further new products into the market." Expenditures in 1932 for betterments totaled \$1,845,025. The report states: "With the reorganization of the financial and banking affairs of the country now being undertaken and the balancing of all governmental budgets, essential to a recovery in business, we look forward with confidence to better conditions in the steel industry."

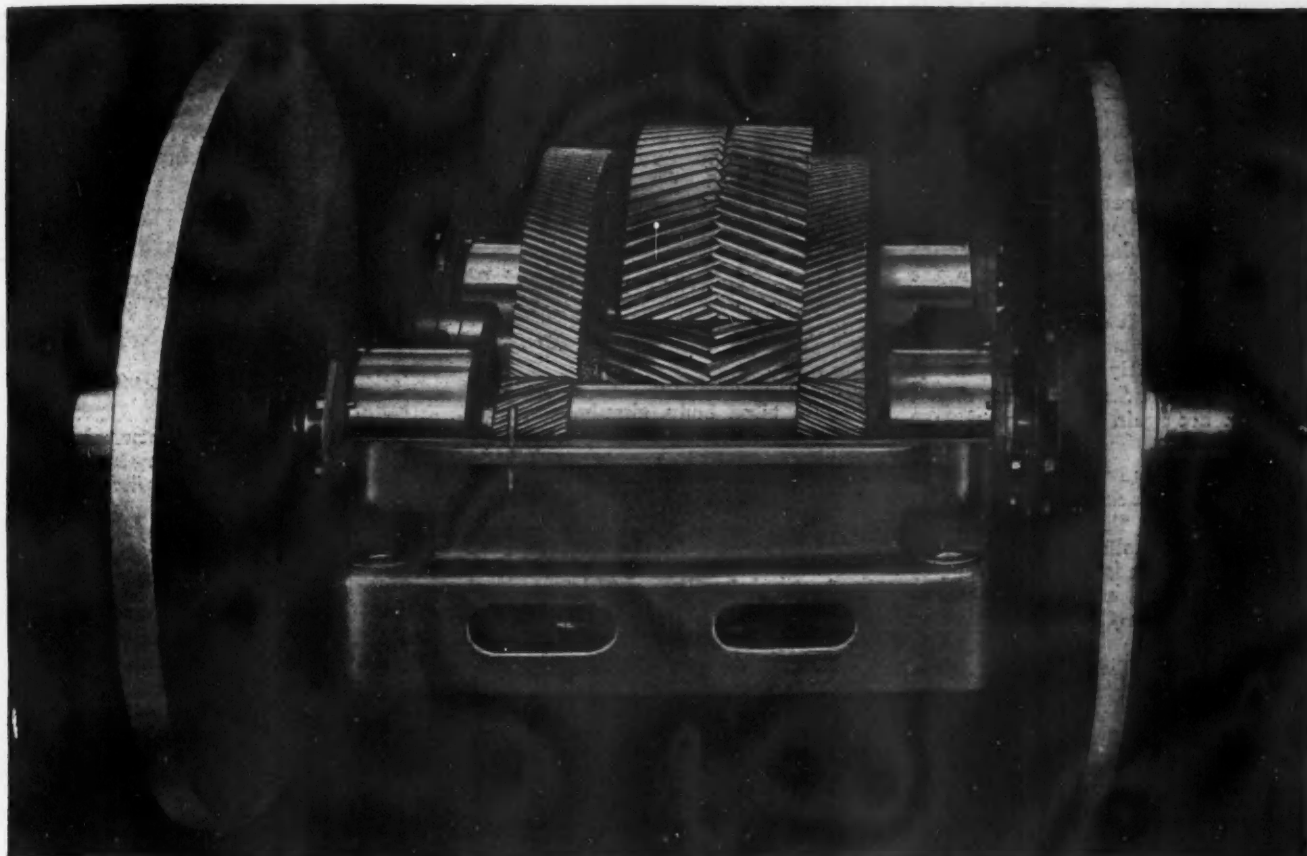
International Nickel Co. of Canada, Ltd., had a net loss of \$135,344 in 1932, compared with a net profit of \$5,094,497 for 1931, after deducting all charges for depreciation, depletion, taxes and other reserves. Net operating income, however, was \$3,363,399, from which was deducted \$735,306 for interest and reserves other than depreciation and mine depletion, leaving a balance of \$2,628,093, which is \$694,184 in excess of preferred dividend disbursements of \$1,933,909. Cash and securities at Dec. 31, 1932, were \$5,793,100.32 as compared with \$3,112,019 at the close of the previous year. The increase in cash was due to liquidation of inventories and receivables and to the relatively small capital expenditures made during the year.

Colorado Fuel & Iron Co. reports a total loss in 1932, after all charges, of \$4,253,261. The company had an operating profit of \$1,544,070, but charges for depreciation, bonded interest, inventory adjustments, repairs, maintenance, taxation, etc., turned this into a loss. The company's 1932 ingot production was only 24 per cent of its 1930 tonnage.

LEWIS GEARS

Painstaking care, precision, accuracy, far beyond the ability of any photograph to illustrate, are elements that enter into the cutting of Lewis Gears. The results have long justified cus-

tomers confidence and Lewis reputation for trouble-free machinery. We invite your correspondence regarding up-to-date Rolling Mill Machinery of all types.



Balanced roller bearing equipped Double REDUCTION GEAR DRIVE made by Lewis with very accurately generated teeth up to and including 6,000 H. P.

LEWIS MAKES

Mill drives up to and including 6,000 H. P. Shape Straightener Machines up to and including 24" I beam. Motor operated Screw-Down for Mill. High Speed Gear Sets for Continuous Rod Mills. Continuous Bar and Billet Mills. Cold Mills for Sheet and Strip. Rail Breakers. Rail Re-rolling Mills. Universal Mill Spindles. Chilled Iron and Iron Alloy Rolls for Iron, Steel, Brass, Copper, Aluminum, Zinc and Nickel. For hot sheets, tin plate and strip—for cold sheets, tin plate and strip. For merchant bars and rods. Shears—Vertical Alligator—Cropping—Plate and Squaring. Special Machinery—Testing Machines and Iron and Steel Castings.

LEWIS FOUNDRY & MACHINE CO



P. O. BOX 1591
PITTSBURGH, PA.

Mass Production Methods for Malleable Castings

(Concluded from Page 467)

space, which is served by a crane and magnet, is divided into bins according to analysis and character of the material. In this way the different charges may be made up as required, directly from the storage yard. The usual proportion of a charge is 43 per cent pig iron, 18 per cent malleable scrap, 6 per cent steel scrap, and 33 per cent sprue.

Scheme of Melting

The general scheme of melting has great flexibility, as there are five furnaces, each one of which may be shut down entirely, operated normally, or boosted so as to pour off twice a day. When such double pouring is called for, fires are started at 9:00 in the evening and shut down at 7:45 the next morning. It takes one hour to pour off and 30 min. to cool off the furnace sufficiently to permit charging for the second round. This means that fires are again started about 9:30 in the morning.

The fuel is pulverized coal, which is blown into each furnace through three burners. The individual furnace design follows conventional lines. Fire brick is placed on edge to form the bottom and during charging this is covered with boards for protection. The new charge is dumped close to these boards from a toggle bucket supported by an overhead crane. Furnaces which are all of the same size, 22 ft. long, 6 ft. 6 in. high, and 6 ft. wide, are tapped into half-ton ladles, which are transported by an overhead monorail system to different points on the foundry floor. Smaller ladles are used to serve the individual floors in the smaller castings section.

Uniform Flasks Used

Separate pouring gangs operate continuously throughout the day, taking care of the entire production, and another gang, also on continuous operation, collects the castings and places them on platforms, which are later picked up by lift trucks and carried to the anneal ovens. Uniform flask equipment is used, as shown in one of the illustrations. These are malleable castings provided with interior corner webs to help support the sand. Lugs are placed at the four corners to facilitate handling, and flanges are left for the clamps which hold the copes in place. The cope part is laterally symmetrical so that it may be used either side up.

Normally one molding machine will work exclusively on the production of copes and an adjacent machine will turn out the corresponding drags. But when the production time

for these two parts varies, more machines are used on the slower part so that a definite group keeps production equalized between the copes and drags for a single casting. The average production of good malleable castings is 1800 lb. per mold per day.

Annealing Practice

The annealing cycle is speeded up by blowing a powerful blast of air through an open furnace during the time of charging and thus making it possible to load a furnace while it is

still hot. The annealing furnaces are each 40 ft. deep and 6 ft. wide and, when charging, air is blown through these at the rate of 10,000 cu. ft. a minute.

The machining of the completed casting is a highly specialized operation. An upright multi-stage milling machine, equipped with quick-acting jigs and served by a roller conveyor and three operators does all the required machining in one complete cycle. The tool has 12 stages and rotates automatically one-twelfth turn to the left after each operation.

Final inspection of the castings is made as they travel along a roller conveyor which leads to the shipping platform. The end of this conveyor is portable so that the castings after inspection may be loaded directly into the waiting freight car.

Welding in the Steel Industry

(Continued from Page 465)

models, is illustrated in Fig. 4. If we have a rigid body, simply supported, or supported not at all, and if we apply a force (P_1) at point A, we get a deflection (D_1) at point B. If we then apply a load (P_2) at B, we get a deflection (D_2) at A. Maxwell's Reciprocal Theorem says that the loads and the deflections are in a simple geometrical proportion. Therefore, if we produce a known deflection within a rigid structure at the reaction points, and if we measure the corresponding deflection at the load point, then, knowing the applied load, we can immediately evaluate the reaction. It is this method which will be used to determine the character-

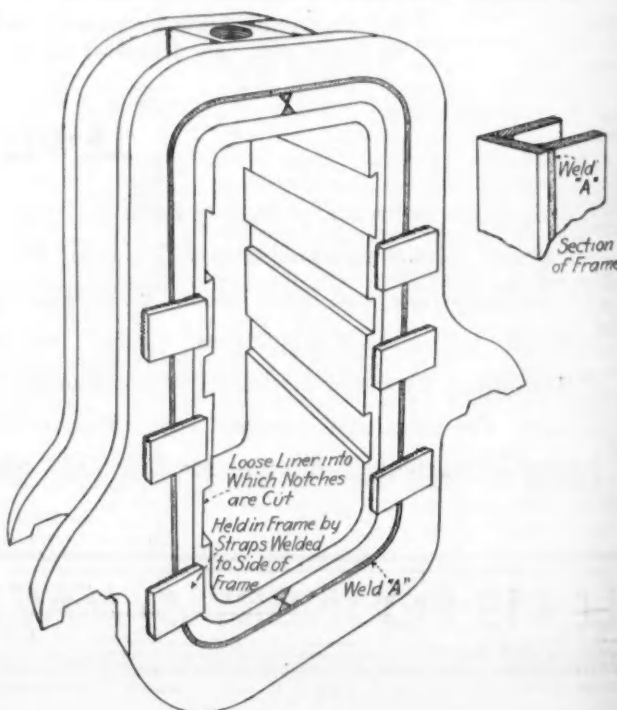
istics of a rigid frame having internal loads applied to it.

Such an analysis, illustrated in Fig. 4, shows that the bending moments in such a frame are distributed as shown in Fig. 5. It is this bending moment diagram, plus the simple tension in the sides, that determines the final shape of the frame, as it is shown in Fig. 6.

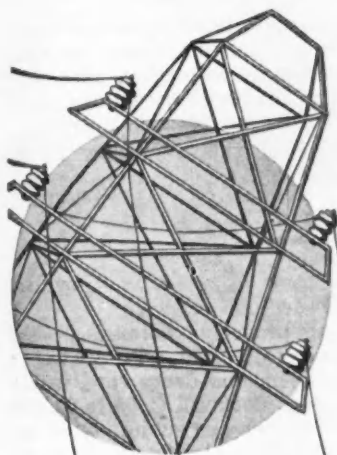
It is now a matter of getting the chuck mountings back in the frame in such a manner as not to re-create any notches, and this suggested method is illustrated in Fig. 6.

The following balance sheet tabulates the costs which can be charged
(Continued on Advertising Page 12)

FIG. 6.—Final shape of frame with chuck mountings placed so as not to re-create any notches.



T O - M O R R O W



KEROSENE LAMPS

OR . . .

KILOWATT HOURS

● Three years of depression have brought no indication that the Age of Power is in retreat. Kerosene lamps are not replacing kilowatt hours.

THE PROOF?

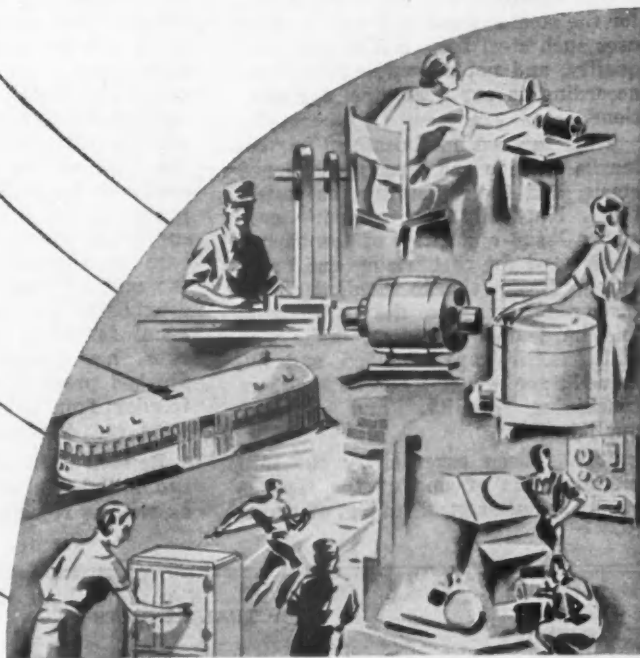
In 1932 public utilities served 24,149,000 customers, compared with 23,810,000 in 1929.

The number of farms served was 705,075 against 698,786 in 1931.

Total electricity sold to customers was 63 billion kilowatt hours; off only 11 per cent from 1931.

Although output of current has continued high, the production of electrical equipment of \$2,334,000,000 in 1929 had declined 35 per cent in 1931 and still more in 1932.

Wear and tear are taking their toll on the electrical equipment now in use and a huge market, now accumulating, will become apparent with the return of more stabilized conditions.



INTERLAKE IRON CORPORATION

PIG IRON - COKE

PLANTS—CHICAGO . DULUTH . TOLEDO . ERIE

PICKANDS, MATHER & COMPANY, Sales Agents

CLEVELAND . CHICAGO . DETROIT . ERIE . TOLEDO . MINNEAPOLIS . DULUTH

against a typical mill housing which has broken while in service:

1 housing: 30,000 lb., at 6c per lb.	\$1800.00
1/6 of the pattern cost (pattern at \$400.00)	70.00
Labor to replace broken housing: 10 men, 8 hr. (millwrights, riggers and crane-men)	78.00
Tonnage lost during breakdown: 4 mills, 8 hr.; 10 tons per mill per 8 hr. = 40 tons at \$46.00 per ton	1840.00
Emptying charge, 4 furnaces; re-charging labor, heat loss, warming up mills, etc.	67.00
	\$3855.00

Against this \$3,855.00 charge we can place the cost of a welded housing at about \$2,000.00, plus an assurance that this mill will not break throughout a service life of eight to 10 years. The importance of having reliable equipment in a production line cannot be over-emphasized.

While these figures are conservative, and applied to a type of housing service which is considered small in the steel industry, they will be multiplied many times when such conditions as have been illustrated occur in a blooming mill, or various and heavy type continuous mills. For instance, in a continuous group of mills, where the breakage of one housing interrupts the entire production for 12 hours, the tonnage loss may be as high as 2000 tons.

In conclusion, the remedies for conditions such as have been talked about can only be supplied through the use of properly-designed, predictable structures. Welded rolled plate, by its very nature, is eminently predictable. Its solid homogeneousness cannot be approached by any other process of manufacturing, and the utter freedom with which a well-informed designer can join rolled plates will result in a welded structure whose characteristics are thoroughly known.

been extremely low, or almost nothing. Regarding the control of the carburizing and hardening quality, it has been our experience that this factor can be almost 100 per cent regulated in the mill practice.

On the other hand, "pick-ups" from warehouses of items answering similar chemistry, more often meet with rejections than with acceptance, when subjected to our tests.

Typical of this chemistry is the following heat :

	Per Cent
Carbon	0.18
Manganese	0.85
Sulphur	0.035
Phosphorus	0.016
Silicon	0.17

When properly carburized and hardened, this steel will produce a very uniform and dense case, with a hardness of Rockwell C, 65 to 67. The core properties are subject to an unusual degree of refinement if required.

We are greatly indebted to those foremost thinkers in metallurgical science, M. A. Grossman and E. C. Bain, in each of whose Campbell memorial lectures very enlightening explanations of these complicated phenomena are given. The United States Bureau of Mines' publication, "Abnormality in Steel," by C. H. Herty, Jr., is a very valuable reference in this connection.

Time does not permit our more than mentioning a very successful and, for some purposes, a very practical alloy steel of the modified air-hardening variety which will produce 70,000 lb. per sq. in. elastic limit in the center of a 2½-in. section merely by normalizing. Where broaching, serrating, or Fellows-shaping are required in finishing the part, this steel in certain applications, though initially costing more than carbon steel quenched and drawn to equivalent hardness and physicals, will ultimately be more economical to use. Its properties depend primarily upon grain size control and a combination of alloying elements, manganese, chromium, and vanadium, or other variants.

Heat Treatment Control

By means of a form of notification captioned a "Material Analysis Report," all vendors of steel products intended for heat treatment supply our inspection and metallurgical departments with complete information as to the materials, bar stock, forgings, castings, etc., giving car number, quantity, steel identification, corresponding marking, and chemistry. The metallurgical department, having previously passed upon the physical characteristics of the steel thus identified, now confirms and accepts the material. Any special notations concerning heat treatment are conveyed on a "Material Disposition Report."

The parts arrive at the heat-treating department carrying some form (Concluded on Advertising Page 16)

Selection and Heat Treatment of Steel for Caterpillar Tractors

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significance in eliminating the inferior quality, note results in table below.

Our specifications make it possible for the steel sources to divert to other uses such steel as is S.A.E. No. 2345 quality, and not otherwise acceptable according to our gear steel specifications.

Thus far, we have confined our remarks only to the directly hardened steels, and their metallurgical selection. Naturally, our company consumes large quantities of low-carbon steels used for carburizing and hardening. In addition to the demand for proper response to the carburizing and hardening processes, other special qualities are specified and obtained, for example, broaching or machining quality, and welding quality.

It has been asserted by the mill metallurgists of one of the sources of our seamless steel tubing, of which

we buy annually tonnage running into thousands, that on the basis of our carburizing and hardness tests one mill heat out of five would usually have to be diverted to some other application. In 1928, steps were taken to raise the normal manganese content of these steels, and make this addition after or simultaneously with the "killing" or deoxidizing of the heat with ferrosilicon. Gradually this practice was adopted by the mills supplying hot-rolled and cold-finished bars of similar application. While the melting practice and method of deoxidizing are more expensive than usual for these grades of commodities, nevertheless the cost of the finished product in the mills, due to freedom from rejections, low chipping costs, etc., is ultimately lower.

Rejections in our plants of identified mill heats of these commodities, as well as rejections in process, have

CHEMISTRY		ACTUAL RESULTS					
		Per Cent					
Mill Heat No.		C	Mn	S	P	Si	Ni
(A)		0.46	0.61	0.031	0.016	0.20	3.57
(B)		0.47	0.70	0.036	0.018	0.24	3.55
PHYSICAL PROPERTIES							
(Drawn at 425 deg. F. for 1½ Hr.)							
		Tensile Strength, Lb. per Sq. In.	Yield Point, Lb. per Sq. In.	Elongation, Per Cent	Red. of Area, Per Cent	Charpy	Tensile Impact
(A) Good	R.C52	278,000	214,000	11.5	44.3	18 ft.-lb.	62 ft.-lb.
(B) Bad	R.C53	288,500	214,500	11.5	34.1	5.5 ft.-lb.	9 ft.-lb.

AN OUTSTANDING ACHIEVEMENT



Electrunite?

A new type of boiler tube of Steel or rust-resisting Toncan Iron, made by electrical resistance welding under the Johnston patents owned by Steel and Tubes, Inc.

What Are Their Advantages?

Because Electrunite Boiler Tubes are made from strip steel they possess a uniformity in diameter, wall thickness and concentricity impossible to attain in tubes made by other processes. Due to the mechanically controlled electrical resistance method employed in welding, the weld is as strong as the wall. Tubes are full-normalized, soft, ductile and of uniform grain structure. Every tube is twice tested—hydrostatically and under air pressure. Electrunite Boiler Tubes, because of these qualities, make possible tighter joints with worth while sav-

ings in time and labor. Users report savings of 15 to 20 per cent in installation costs.

Where Can They Be Used?

Electrunite Boiler Tubes can be used in either fire-tube or water-tube boilers requiring either straight or bent tubes.

Who Has Approved Them?

A.S.M.E. (Case 709)
U. S. Department of Commerce, Steamboat Inspection Service.
American Bureau of Shipping.

Where Can They Be Purchased?

Electrunite Boiler Tubes may be purchased from the manufacturer or authorized distributors who carry stock in all sizes and are equipped to give you prompt service.

NOTE: This is the first public announcement of Electrunite Boiler Tubes, made after the tube has proved itself superior in actual service. Tubes made by the same process have been in use in pressure service with marked success for the past three years. Electrunite is merely another application of the resistance welding process through which over one billion feet of tubing and pipe have been produced by this organization during the last 15 years.

STEEL AND TUBES, INCORPORATED

World's Largest Producer of Electrically Welded Tubing

CLEVELAND » » « « OHIO

A UNIT OF REPUBLIC STEEL CORPORATION

Distributors

JOHN B. ASTELL & CO., Inc.
90 W. Broadway, New York, N. Y.

WILLIAMS & CO.
2118 Spring Grove Ave., Cincinnati, O.

WILLIAMS & CO.
901 Pennsylvania Ave., N. S., Pittsburgh, Pa.

CHICAGO TUBE & IRON CO.
2531 W. 48th St., Chicago, Ill.

WILLIAMS & CO.
1728 E. 22nd St., Cleveland, O.

THE SERVICE STEEL CO.
1435 Franklin Ave., Detroit, Mich.

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of identification, such as permanent stamping, painting or tagging. The parts are then processed as mill heat lots, on which very careful records are kept. With some parts, pilot lots are treated from each new mill heat, resulting in the establishing of the quenching time and draw temperature for the entire product of that certain mill heat. Machining operations are also many times regulated by the result of such pilot lots.

For each part, there has been prepared a "Heat Treat and Test Instruction Sheet." This serves the heat-treating department in the same manner that the factory route sheets determine the order of processing.

These "Heat Treat and Test Instruction Sheets" give all the essential information as to the type of furnace to be used, the method of loading and spacing in the furnace, the location of the thermocouples, the kind of fixtures used in heating, and quenching, the energy input and its regulation during the cycle, the quenching method and medium, the quenching time, the hardness after quenching, the drawing method and time, the final hardness tests and their exact locations on the part. After this heat treatment of rough parts, such as forgings and castings, they are given a dab of aluminum paint in order to distinguish them thereafter from the untreated parts.

After testing at final hardness inspection, a card is filled out giving a permanent record of the individual piece or part performance. The value of these records becomes more emphatic when something shows up wrong with a group of parts from a certain mill heat. The parts, whether finished, semi-finished or rough, can be segregated and held in abeyance while production is sustained by other satisfactory material. From the standpoint of service performance, these records are valuable in running down trouble and improving product.

Equipment for Heat Treating

The general policy of our company has been to purchase furnaces and other equipment, if such were available, of the character and design suitable to our product. Unfortunately, however, this has resulted in our designing and constructing the majority of our heat-treating equipment. We have more than a hundred heat-treating furnaces (or machines as they are in many cases) about 85 per cent of which are electrically energized. The type of furnace, the kind of energy, and the initial expense of the installation have as a rule been subordinated to the more important factor, that of the final physical characteristics of the heat-treated parts.

Plurality of heating zones, gradual heat input, sufficient holding time at temperature, are safeguards which need to be built into the equipment if uniform physical characteristics are

demand of the operation of heat treatment.

As stated previously, (THE IRON AGE citation) in connection with heat treatment of Caterpillar plants, "All ideals and purposes have been shaped toward obtaining the best possible inherent steel quality initially, and so treating the steel that its final characteristics are the result of its maximum physical enhancement."

What the Machine Has Done to Us

(Concluded from Page 475)

data 1914 to 1919 we would find closer agreement in time for the low points. The relative amplitude of movement of the two curves of course reflects the relative amplitudes of cost of living and wholesale commodity price indexes. In general the two curves move in unison and tell substantially the same story.

Summary

To summarize mechanization and investment in the manufacturing industries of the United States it would appear that, while the transfer of skill from the man to the machine has been the significant thing about the mechanization of industry, the application of power to manufacturing process is a quantitative measure of the degree to which that transfer of skill to the machine has been found profitable and is also a quantitative measure of the growth of investment in manufacturing equipment.

Progress in mechanization has been profoundly affected by fundamental changes in methods but on the whole the power capacity provided has increased at a rate more rapid than number of wage-earners so that power per wage-earner has also increased. The period of most rapid advance has, however, been during the decade of the 1890's and not, as generally believed, in the 1920's. The suggested trend indicates a retardation in rate of increase and the approach toward a maximum.

Progress in mechanization has involved also large increases of capital invested in equipment in the aggregate and per wage-earner. Capital investment has increased in unison with power capacity but at a rate more rapid per wage-earner and the suggested trend indicates a nearer approach to a maximum.

Investment of capital is conditioned by a consideration of prospective income on such investment and that income like wage earnings has its real value as well as money value.

Real income is subject to influences slightly different from those applying to wage earnings. The real value of income on invested capital is subject to a greater diversity among recipients and to long time trends rather than to current fluctuations.

Real value of income is subject to wider fluctuations than is the real wage. Income from invested funds is less flexible than wages. Real value of income tends to be disproportionately high in periods of falling commodity prices and disproportionately low in periods of rising commodity prices.

Trade Notes

Barber-Colman Co., Rockford, Ill., manufacturer of milling cutters, hobs, hobbing machines, reamers, etc., will maintain direct factory representation in New England. F. R. Ridgley will have an office with Barber-Colman Co. of Massachusetts, at Framingham and will cover Massachusetts, Rhode Island and a portion of Connecticut. In Chicago, the office of the machine and small tool division of the company will be merged with that of the electrical division and will henceforth be found at 221 North LaSalle Street. Clinton S. Morey will be the representative.

Superior Steel Corp., Pittsburgh, has appointed the Horace H. Potts Co., Philadelphia, as warehouse representative for its rust resisting metals in strip form.

Kingsbury Machine Tool Corp., Keene, N. H., has appointed Riordan Machinery Co., 218 Curtis Building, Detroit, as its exclusive representative in the Detroit District.

Metallizing Engineering Co., 214 Provost Street, Jersey City, N. J., has installed Metallizing equipment and machine tools to handle Metallizing work on a production basis at its own plant and also has portable equipment to do work in the field. The company will give instructions in Metallizing commencing April 10. A two-weeks' course will be given in operation equipment, preparation of the surface, coating of various objects, metallurgy and chemistry in connection with Metallizing and the figuring of costs in connection with Metallizing job work. The first class will be limited to 25 and will be in charge of R. A. Axline, formerly of the California Institute of Technology, who will be assisted by L. E. Kunkler, of the Metallizing Co. of America, Inc., and Alfred J. Weisbecker, of the Simmons Machine Tool Corp.

Capitol Steel Corp. of New York, 186 Joralemon Street, Brooklyn, fabricator and distributor of reinforcing steel products, has established a branch office at 253 South Fifth-third Street, Philadelphia, in charge of E. R. Van Hook, district manager.

Leonard J. Buck, Inc., 74 Trinity Place, New York, has been appointed exclusive agent in the United States and Canada for the sale of fluorspar produced by the St. Lawrence Corp. of Newfoundland, Ltd., Canada.

Metallizing Co. of America, Inc., has opened an Eastern sales and distributing office at 214 Provost Street, Jersey City, N. J., in charge of R. A. Axline. Eastern offices of the International Metallizing Association have also been opened at the same address. L. E. Kunkler, president of the association, will spend part of his time at the Jersey City office. The company has also opened an export office at 15 Moore Street, New York, in charge of J. Glosner.

Otis Steel Co., Cleveland, reports net loss during 1932 of \$2,830,155 after interest and depreciation. This compares with a loss of \$1,571,342 during the preceding year. On Dec. 31 cash amounted to \$577,941, current assets \$4,621,416 and current liabilities \$2,621,591. These compare with cash \$410,531, current assets \$6,099,317 and current liabilities \$2,924,836 at the end of the previous year. Total assets at the end of 1932 were \$34,165,332 against \$38,377,092 Dec. 31, 1931.

Shipments of T-rail track of 60 lb. per yard and heavier in February amounted to 1822 net tons, against 1984 tons in January, according to the monthly report of the American Iron and Steel Institute.